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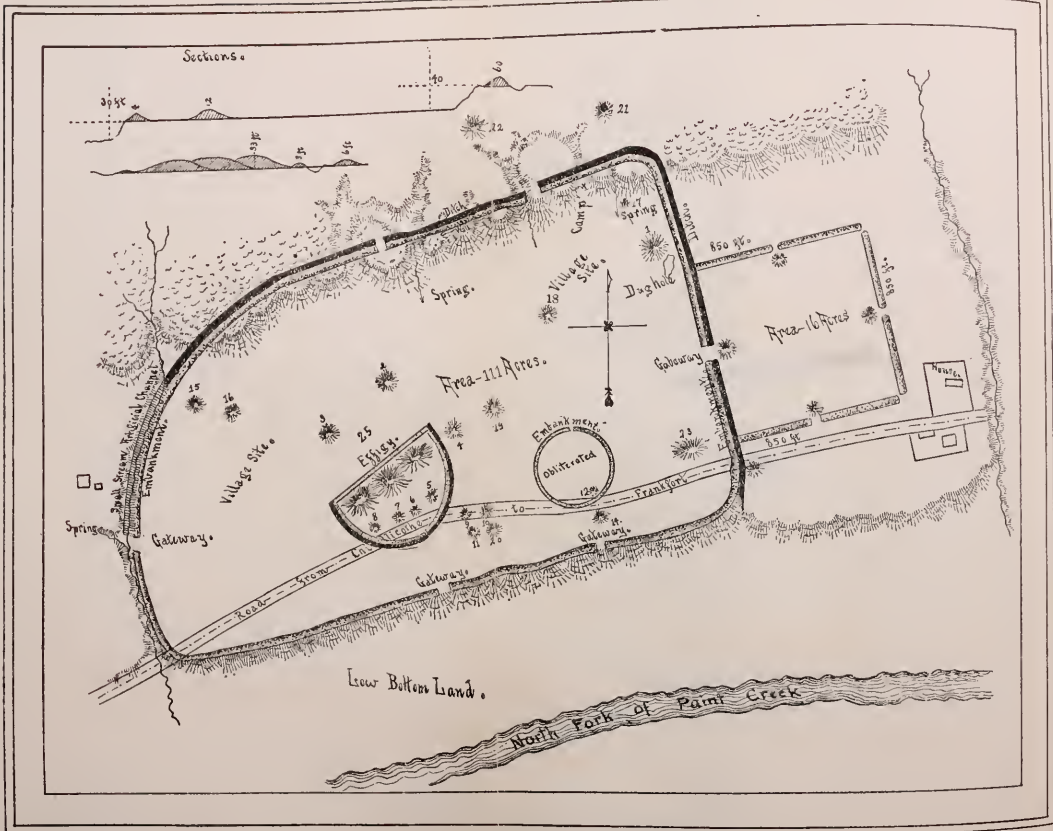
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FIELD MUSEUM OF NATURAL HISTORY

PUBLICATION 211

ANTHROPOLOGICAL SERIES

VOLUME VI, No. 5

THE HOPEWELL MOUND GROUP OF OHIO

By

WARREN K. MOOREHEAD

Curator of Museum of American Archaeology

Phillips Academy, Andover, Mass.

48 Plates and 68 Text-Figures

BERTHOLD LAUFER

Curator of Anthropology



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THE HOPEWELL MOUND GROUP OF OHIO

BY WARREN K. MOOREHEAD

PREFACE

In view of the height of aboriginal culture attained by the Hopewell people and the importance of the collection secured from these mounds, it seems advisable to present a brief historical sketch. The activities of the Department of Anthropology of the World's Columbian Exposition, Chicago, were wide-spread and known throughout the length and breadth of the scientific world. Yet, notwithstanding the magnitude of its operations—researches carried on by a score of workers—no report was ever published. As a matter of record, therefore, there should be this brief account of the Department and how the Hopewell survey came into being.

About 1890, shortly after the Exposition was organized, Professor Frederick W. Putnam of Harvard University was appointed Chief of Department M, as that branch of the Exposition was called officially. Eight or ten young men, who had done work in American archæology and ethnology, were employed as field assistants by him, and they were assigned different sections of the North and South American fields. The young field assistants, as well as older and more experienced men, carried to completion studies and explorations which were important. At the end of the Exposition, all this material was presented by Professor Putnam to Field Museum of Natural History, in order that it might be permanently preserved.

Professor Putnam appointed me field assistant for Ohio about January, 1891. I organized a force of eleven or twelve men, located at Fort Ancient, Warren County, Ohio, and later at Oregonia, distant four miles, and carried on explorations for four or five months. These two sites were dominated by what is known as the Fort Ancient culture, which is quite the opposite of the Hopewell culture. The collections made at Fort Ancient and Oregonia, together with skeletal material, are now in Field Museum of Natural History.

The work at Oregonia was a repetition of that at Fort Ancient; that is, we found and opened a hundred stone graves similar to those of Tennessee and Kentucky, yet containing few artifacts.¹

¹The exception was one of those Tennessee flint "swords" or ceremonial knives, 14 inches in length.

I had in our camp Squier and Davis' volume "Ancient Monuments of the Mississippi Valley." This work had been studied and consulted by me frequently. Notwithstanding some inaccuracies, or lack of definite knowledge on the part of the authors, I still consider it the ranking pioneer-work on the antiquities of the Ohio Valley. I wrote to Professor Putnam that, according to Squier and Davis' volume, there were several unexplored mound groups in the Scioto Valley, and as field assistant I strongly urged that the survey move over to the Scioto Valley, where we could secure an exhibit of both educational and archaeological value for the Columbian Exposition. Professor Putnam was very busy directing many expeditions, but he referred me to Dr. C. L. Metz of Madisonville, Ohio, whom he had asked to take charge of all Ohio Valley explorations. Hearing nothing further from Dr. Metz, we secured two large wagons, loaded our camp outfit, and moved across country to Mr. M. C. Hopewell's farm on the North Fork of Paint Creek, Ross County, reaching there about the end of August, 1891. Squier and Davis had spoken at considerable length of the importance of this group of mounds, which they called "Clark's Work, distant some seven miles from the city of Chillicothe." From reading their volume, it was my firm conviction that here we would find one of the principal if not actually the largest, settlement of the Scioto Valley mound-building tribe. Thus Squier and Davis' work more than anything else brought about the exploration of the Hopewell group. It was not chance, as some have intimated.

The exhibits of copper, obsidian, shell, bone, and clay artifacts attracted the attention of thousands of visitors at the Exposition. Many letters were received in subsequent years from both institutions and individuals asking for a report.

Few collections have had more "experiences" than these objects from the ancient Ohio mounds, and it might be well to mention a few points of interest. When the collection was boxed, ready for shipment, it was attached by a farmer living near the group, who claimed he had a contract to fill the large pits. This suit was fought by me, the collection saved and shipped to Cambridge, Mass., where it was studied and then re-shipped to Chicago. After the Exposition, it was again forwarded to Cambridge, studied, and returned to Chicago. Professor Putnam expected to write the report, but failed to do so; and Dr. George A. Dorsey made some preparation toward publication. Finally, after some twenty-nine years, thanks to the courtesy of the Trustees of Field Museum of Natural History, I am able to present this report.

I desire to state that, while the original photographs, some of the

maps, Dr. Thomas Wilson's field report, G. A. Dorsey's copy of the original field-notes, and studies made during two visits to Field Museum, lie before me, yet, since the work ended about February 1st, 1892, many years have elapsed. Much that occurred during the course of explorations has been forgotten, and must necessarily be omitted. Some of the ground plans are absent. The drawings of the mosaics or boulder effigies are gone; and the original notebook, which my friend, Mr. Willoughby, tells me he saw and examined, cannot be found. However, this does not affect the accuracy of the report as a whole, although it is manifest that a better report might have been presented had the field-notes been expanded within a year or two after the completion of the field-operations.

In addition to the Trustees of the Museum, I desire to thank Mr. C. C. Willoughby, director of the Peabody Museum at Cambridge, Mass., for coöperation, assistance, and advice. Mr. Willoughby personally studied the Hopewell collection, shortly after the exploration was completed. He has very kindly placed at my disposal some three hundred pages of notes and drawings which he made at that time. His familiarity with American prehistoric art-forms has enabled him to point out certain comparisons of interest and value. All of his notes and observations might have been submitted by him in a valuable memoir of his own; yet he unselfishly placed them at my disposal, and I hereby wish to tender him my most sincere appreciative thanks.

The late Dr. Thomas Wilson, for many years curator of prehistoric anthropology in the Smithsonian Institution, visited the Hopewell group on two occasions. He prepared an article setting forth his observations for Dr. Holmes, who very kindly sent me the original document, together with some photographs. Dr. Holmes also visited the Hopewell group, and I am indebted to him for his kindness. Professor W. C. Mills has, during the past years, offered several suggestions, or furnished information concerning his studies of the Hopewell culture in sites other than the Hopewell group itself, and I desire to record full appreciation of his kindness.

I. WORK IN THE HOPEWELL MOUND GROUP

RELATION OF THE HOPEWELL GROUP TO OTHER MOUND GROUPS.—The archæological map of the State of Ohio presents 5,396 mounds, village sites, enclosures, fortifications, etc. This map was begun by me about 1894, but was brought to completion by Professor Mills in 1914. There are about 992 of these ancient monuments in the Scioto Valley. Further reducing our number to the earthworks, enclosures or mound groups lying in the main Scioto Valley and not ascending tributary streams into the uplands, where the Fort Ancient culture obtains, there probably are two hundred or more groups of ancient structures of earth varying from a few to many mounds. Finally, narrowing the total to larger sites such as the Hopewell on the North Fork of Paint Creek, there are some large groups above and below the city of Chillicothe on the main Scioto, and a group at Circleville, which was destroyed at the time that town was built; also some between Chillicothe and Portsmouth. These mound groups represent the culture which Professor Putnam seems to have sensed to some degree in his early work in the Ohio Valley. Squier and Davis consider it quite different from that of the later Indians. The work at Fort Ancient and Hopewell emphasized the difference between these two cultures, and finally Professor Mills gave the cultures concrete terms, "Fort Ancient and Hopewell."

DETAILED DESCRIPTION OF THE HOPEWELL GROUP.—The first mention of the Hopewell group is made in CALEB ATWATER's "Archæologia Americana" (1820). This and other accounts will be found in the bibliography, which appears as an appendix to my report. Atwater was a resident of Circleville, Ohio, for many years. I made inquiry in 1892 among the older residents of Circleville, one or two of whom remembered him; but nothing concerning his work could be learned, except that he spent considerable time examining the mounds. In his map he omits a number of mounds, but presents a circle enclosing six large mounds, which were shown on my first map as the Effigy, but which we now call Mound 25. Atwater speaks of this Mound 25 as 35 feet high and 400 feet at the base (longest diameter). Squier and Davis mention seven mounds surrounded by this circle, three of which constituted Number 25. Of these three (joined together) they stated the elevation as 33 feet, the length as 500 feet, the width as 180 feet.

It must be remembered that the Hopewell group lies on very rich soil, and has been cultivated continuously. From Atwater's description it would appear that the three mounds forming No. 25 were built on a terrace or platform. It is not necessary to quote Atwater's description, but what Squier and Davis said might well apply to the work as we found it. With the exception of a few omitted mounds, I herewith append same, but present Mr. Cowen's map instead of theirs. It will further be observed that we followed their numbering as far as possible, but added numbers to mounds not recorded by them. In honor of the owner, M. C. Hopewell, we changed the name from Clark's Works to Hopewell Group.

CLARK'S WORK; NORTH FORK OF PAINT CREEK.¹—The work here presented is one of the largest and most interesting in the Scioto Valley. It has many of the characteristics of a work of defence, and is accordingly classified as such, although differing in position and some other respects from the entrenched hills just described. The minor works which it encloses, or which are in combination with it, are manifestly of a different character, probably religious in their design, and would seem to point to the conclusion that this was a fortified town rather than a defensive work of last resort.

It is situated on the North Fork of Paint Creek, on the estate of W. C. Clark, and occupies the entire width of the second terrace, which here presents a broad and level plain, of exceeding beauty and fertility. Its general form is that of a parallelogram, 2,800 by 1,800 feet, with one of its corners somewhat rounded. On the side next the creek, it is bounded by a wall four feet high, running along the very edge of the terrace bank, and conforming to its irregularities; these, however, are slight. Its remaining sides are bounded by a wall and exterior ditch; the wall is 6 feet high, by 35 feet at the base, and the ditch of corresponding dimensions. The lines ascend the declivity of the tableland back of the terrace, and extend along its brow, dipping into the ravines, and rising over the ridges into which it has been cut by the action of water. Wherever the ravines are of any considerable depth, the wall has been washed away; but in all cases leaving evidences that it once extended uninterruptedly through. The bank of the terrace is 30, that of the tableland 50 feet in height.

The area thus enclosed is one hundred and eleven acres. To the right of the principal work, and connecting with it by a gateway at

¹This plan is from an original, minute survey by the authors. A plan and description of the same work were published by ATWATER in the *Archæologia Americana*. It will be found to differ in some important respects.

its centre, is a smaller work of sixteen acres area. It is a perfect square, its sides measuring respectively 850 feet. It has gateways at the middle of each side, 30 feet wide, and covered by small mounds, which are placed 50 feet interior to the walls. There are gateways also at the two outer corners, which are unaccompanied by mounds. The opening which leads to the principal enclosure is twice as wide as the others. The walls of the smaller works are much lighter than those of the larger one and have no attendant ditch.

Within the area of the great work are two small ones; one of them is a perfect circle, 350 feet in diameter, bounded by a single slight wall, with a gateway opening to the west; the other is a semi-circular enclosure, 2000 feet in circumference, bounded by a slight circumvallation and ditch, as represented in the plan. Within this last enclosure are seven mounds; three of which are joined together, forming a continuous elevation, 35 feet high by 500 feet long, and 180 feet broad at the base. The ground within this work appears to be elevated above the general level of the plain, whether designedly or by the wasting of the mounds it is impossible to say. There are other mounds at the points indicated in the plan, most of which have been explored; with what results, will appear in the chapter on mounds. It may nevertheless be proper to remark that nearly all the mounds examined were places of sacrifice, containing altars, thus confirming the opinion already confidently expressed, respecting the character of the work.

Where the defences descend from the tablelands to the left, is a gully or torrent-bed, which, before the construction of this work, kept the course indicated by the irregular line. It was turned by the builders from its natural channel into the ditch, along which it still runs for a considerable distance; but at one place it has broken over the wall, obliterating it for nearly 200 feet. It is dry at most seasons of the year; and, unless much swollen by the rains, keeps the course of the ditch, terminating in a deep gully, formed by the flow of water from a copious and unfailing spring. This gully is made to answer as a ditch, for the space yet intervening, to the edge of the terrace. It is 15 feet deep, by 60 or 70 feet wide. In several other instances, this artificial change in water-courses has been observed.

The gateways of this work are six in number; one opening into the smaller enclosure to the east, two upon the tablelands, one to the spring first mentioned, and two others toward the creek. Two considerable springs occur within the walls. It is not necessary, however, upon the hypothesis already advanced in respect to this work, to suppose its ancient population wholly dependent upon these sources for their

supply of water, inasmuch as it is very evident that many centuries have not elapsed since the creek, now 100 rods distant, washed the base of the terrace upon which it stands. Indeed, until recently, and until prevented by dykes above, the creek at its highest stages continued to send a portion of its waters along its ancient channel.

The slight wall along the terrace bank is composed chiefly of smooth, water-worn stones, taken from the creek, and cemented together by tough, clayey earth. The wall of the square is wholly of clay, and its outlines may be easily traced by the eye, from a distance, by its color. It appears, as do the embankments of many other works, to have been slightly burned. This appearance is so marked as to induce some persons to suppose that the walls were, in certain instances, originally composed of bricks partially baked, but which have in process of time lost their form, and subsided into a homogeneous mass. That they have in some cases been subjected to the action of fire, is too obvious to admit of doubt. At one point in the lower wall of the square, stones and large masses of pebbles and earth, much burned, and resembling a ferruginous conglomerate, are turned up by the plough. May not this feature be accounted for by supposing the walls to have been originally surmounted by palisades, which were destroyed by the action of fire? Such a cause, however, seems hardly adequate to produce so striking results.

The broken tableland upon which the main work extends forms natural bastions at the north, which have gateways opening to them. At a certain point in the embankment, a quantity of calcined human bones are observable.

Such are some of the features of this interesting work; and if their detail has been tedious, it may be urged in extenuation of such minuteness, that descriptions have hitherto been quite too vague and general. Minute circumstances are often of the first importance in arriving at correct conclusions. The comparative slightness of the wall and the absence of a ditch, at the points possessing natural defences—the extension of the artificial defences upon the tablelands overlooking and commanding the terrace,—the facilities afforded for an abundant supply of water, as well as the large area enclosed, with its mysterious circles and sacred mounds,—all go to sustain the conclusion that this was a fortified town or city of the ancient people. The history of its fall, if its strange monuments could speak, would perhaps tell of heroic defence of homes and altars and of daring achievements in siege and assault.

The amount of labor expended in the construction of this work,

in view of the imperfect means at the command of the builders, is immense. The embankments measure together nearly three miles in length; and a careful computation shows that, including mounds, not less than 3,000,000 cubic feet of earth were used in their composition. Within this work, some of the most interesting discoveries recorded in this volume were made.

OUR SURVEY AND MEASUREMENTS; COMMENTS ON CHANGES SINCE 1845.—The map of our survey (Frontispiece) was drawn by Clinton Cowen, civil engineer. There is one error to be noted, and this is that Mr. Cowen copied Squier and Davis' cross-section, which makes the highest point in No. 25 thirty-three feet. During the course of exploration, we found the highest point from the base line to the summit to be twenty-three feet.

Attention has been called once or twice to discrepancies in the measurements of this large mound. When the survey located on Mr. Hopewell's farm, the mound was covered with a heavy growth of clover. Since Squier and Davis' visit (1844-45) it had been cultivated continuously, and the diameter and length extended. The trenches or cuts made through it show that the original diameter was far less than at the present time. The discrepancies in measurements relate solely to the "wash" or "feather edge." The slope of the mound where it meets the surrounding surface, or area, is very gentle; and this slope is extended by ploughing and natural wash or erosion. Mr. Cowen, Dr. Wilson, Dr. Cresson, and myself differed from three or four to as much as ten feet as to where the feather edge ended, and the natural surface began. It seems to me that the general statement made in the notes, and in one or two preliminary publications, that mound No. 25 was 550 feet long and 220 feet wide, is as near the exact as can be determined. Nothing was found in the cuts beyond a point where their walls were five or six feet in height. The exploration indicated that the original area covered by this mound must have been approximately 400 by 160 feet. Thus it will be seen that the discrepancies in the measurements are confined to the disturbed or extended edges, and are of little consequence.

Squier and Davis have given such a good description that I will only call attention to the points overlooked by them. The entire space enclosed was occupied as a village site, but the indications are most numerous where the words "village site" have been placed on the map. We examined the point in the wall, where they found calcined human bones, but could discover no traces. The burned wall of the eastern square also is so obliterated that accurate observation could not be

made. The change of the stream's course (west side of the enclosure) is interesting and quite unusual in Indian works.

Although manifestly a work of defence, yet I cannot understand how the Hopewell group could have been used as such. The north section of the wall mounts from the second to the third terrace some thirty-five or forty feet in height. The wall is low. The ground a hundred feet north (or back) from the wall commands a plain view of the mounds and village site below. An arrow could be shot from this tableland as far as Mound 18. Dr. Holmes, Dr. Wilson, and other visitors to our camp, could not understand how the works afforded any protection whatever to the inhabitants. The range of high ground to the north, commanding the entire area below, was at least a quarter of a mile in length. The wall, except in the woods, does not appear to have ever been very strong, and even if it was surrounded by palisades, I am of the opinion that a party of warriors could break through at any desired point. A heavy fire from this commanding position would drive the inhabitants as far south as a line drawn between Mounds 16 and 18. Part of the besieging force could continue such a fire, while others made a breach in the walls or palisades, and, entering, deploy along the base of the terrace. They would have a great advantage over the inhabitants, being then upon the same level with them, and protected by a fire from their friends on the higher land above.

This peculiarity is observed in other Indian works. We should not always judge these people's works from our point of view as to proper defensive works. Much that they did seems inconsistent to us; yet there may have been protective features of which we are not aware. I merely offer opinions based on a residence and study of several months.

The forest cutting and draining of land everywhere in southern Ohio has unquestionably affected the water flow. There are heavy freshets and floods in the spring, low water in the summer. The springs mentioned by Squier and Davis do not flow strongly to-day. In fact, save the one in the northeast corner, where our tents were pitched, all the others have nearly dried up.

The distance from the southern edge of the group to the North Fork of Paint Creek is about a third of a mile, being a little farther than indicated by Squier and Davis upon their map.

The central, and, of course, the most interesting feature of the entire work, is Mound 25, formerly known as the Effigy. It is shown by Atwater, as well as by Squier and Davis, as a union of three mounds; four other mounds were situated just south of it, and they are all surrounded by a semicircular enclosure. The circle and the square

(farther east) may represent cosmic symbols, such as the sun and four corners of the earth, or they may have surrounded the dwellings of certain clan elders. This is more or less speculative; yet the squares and circles so frequently found associated with larger mound groups unquestionably were erected for some special purpose. Future explorations and study may more specifically determine their nature. We cannot, after explorations, consider Mound 25 as being composed of three mounds, but rather hold that it is formed by the grouping together of a number of small mounds, and that over their irregular contour was heaped a great mass of earth and gravel, giving it its present appearance. At first, we called it the "Effigy," because, externally, it represents the human trunk; but, internally, its contents give us no authority for such a name.

The morning of September 1, 1891, we spent in looking over the group very carefully. We counted twenty-four mounds. On our map there is no No. 13, but I think it is the one in the right-hand corner, just below the road and above the word "Hopewell." The four mounds within the square to the east were so disturbed and reduced in height that we did not number them. We tested them and found practically nothing.

Plate XXXVIII shows the plain or terrace occupied by the Hopewell group, with our camp in the foreground. Being in high clover, the mounds do not appear clearly in the negative. The view was charming. Often on moonlight nights we looked down upon the mounds and speculated as to the builders, their life, and wondered whence they came, and whither they went.

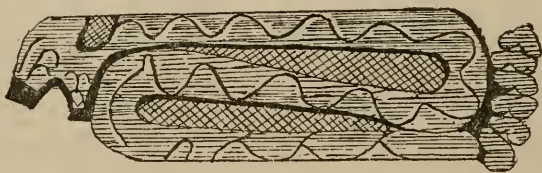


FIG. 9.
Serpent Tablet from Mound No. 1.

EXPLORATION OF MOUND NO. 1.—This mound has entirely disappeared, although there were traces of disturbance, such as burnt earth, etc., on its site. Squier and Davis found some remarkable tablets in this mound, one or two of which suggested the famous "Cincinnati tablet." In Fig. 9 their illustration of the serpent tablet is reproduced. In regard to the mound, they write as follows:—

"From one of the mounds, numbered 1 in the plan of the great enclosure on the North Fork of Paint Creek, were taken several singularly sculptured tablets, of one of which the figure here presented is a copy, so far as it has been found possible to restore it from the several fragments recovered. It represents a coiled rattlesnake: both faces of the tablet being identical in sculpture, excepting that one is plane, the other slightly convex. The material is a very fine cinnamon-colored sandstone, and the style of the sculpture is identical with that displayed in the tablet from the Cincinnati mound already noticed. The original is $6\frac{2}{3}$ inches long, $1\frac{3}{8}$ inches broad, and a quarter of an inch thick. The workmanship is delicate, and the characteristic feature of the rattlesnake perfectly represented. It is to be regretted that it is impossible to restore the head, which, so far as it can be made out, has some peculiar and interesting features—plumes or ornamental figures surmounting it. Previous to the investigation of the mound by the authors, an entire tablet was obtained from it by an individual residing near the spot, who represents it to have been carefully and closely enveloped in sheets of copper, which he had great difficulty in removing. Incited by a miserable curiosity, he broke the specimen, to ascertain its composition, and the larger portion, including the head, was subsequently lost. The remaining fragment, from its exceedingly well-preserved condition, confirms the statement of the finder respecting its envelopment. It seems that several of these tablets were originally deposited in the mound; the greater portions of four have been recovered, but none displaying the head entire. The person above mentioned affirms that the head, in the specimen which he discovered, was surrounded by 'feathers;' how far this is confirmed by the fragment, the reader must judge for himself. The tablets seem to have been originally painted of different colors; a dark red pigment is yet plainly to be seen in the depression of some of the fragments; others had been painted of a dense black color."

We hoped to find something of interest here, but the mound had been completely ploughed down. At the time of their visit, about 1845 or 1846, it was three feet high. A Civil War veteran, living in the neighborhood, had earnestly begged for work. He was unable to use the shovel, but he was set to work with a hand trowel, and for six weeks he dug to a depth of six to ten inches on the site of No. 1 over an area a hundred yards in diameter. This man found more than two hundred fragmentary bone carvings, some fragments of graphite or terra-cotta rings, and other interesting objects. This indicated that Squier and Davis had not taken all the objects out of the mound, but

that during forty-five years of cultivation of the soil these carved bone tubes, rings, and other objects had become destroyed. It is most unfortunate that no complete specimen could be secured. They show precision of line work and a high degree of artistic ability.

EXPLORATION OF MOUND NO. 17.—The mounds were not opened in consecutive order, but according to the convenience of our survey and operations. While the old soldier continued his hand trowel work for many days, the men opened other mounds. Often, after the first five or six feet had been removed from the top of one mound, a part of the crew was transferred to another mound, and the most competent workmen finished the exploration. After opening a few mounds of the Hopewell group, it was discovered that no burials (save an occasional intrusive) would be found above the base line. There was therefore no danger of disturbing burials, if the upper part of the mound was removed by means of teams and scrapers. After the teams had reduced a mound to within four or five feet of the base line, the lower trench was dug out by hand. We used from four to six scrapers, and seven to ten laborers and shovellers. The smaller mounds were dug by hand, and no scrapers were used.

Mound 17 was a hundred yards from camp. It is not numbered by Squier and Davis. It was about 4 feet 3 inches high, 89.4 feet northwest and southeast, 79.10 feet northeast and southwest. Careful plans were made as the work progressed. These are thirteen in number.

A few stones were noted on the south end of the mound, but these could not be considered a layer. The original surface or base of the mound was reached, when the wall of our excavation was three feet and one inch in height. When we proceeded about nine feet, a burnt area appeared on the west side, and charcoal and mica layers to the east. A portion of the field-notes of this mound is herewith reproduced but it is not necessary to insert in this report all the field-notes on the other mounds, much of which would be repetition of Ohio mound exploration in general, that is familiar to most students of archæology. These notes are preserved in Field Museum of Natural History, and I presume, will be accessible to students who care to go into the details of our explorations. Certain of the drawings, sketches or photographs are not reproduced in this publication.

Wednesday, September 2, 1891. Work was resumed this morning at 6.30 a. m. Careful drawings were made of the north-section wall of the excavation, and the depth of the top soil noted as 2 feet 1 inch on the west side and 2 feet 2 inches on the east side. Beneath this was a layer of burnt limestone 3 inches in depth and extending clear across

the excavation. Underlying this was 3 feet of dark earth on the west side, and 2 feet on the east side. A post-hole was encountered on the east side, trending east northeast. It measured 2 feet in depth and 8 inches in width; beside it was a fragment of an earthen vessel and just beyond, toward the east corner of the excavation, lay a charred log of oak wood. This log was covered on its south end by plates of mica placed on edge. A careful sketch of the position of this peculiarity was made, and other notes taken of the mica layer. Mr. Smith also made a photograph of this mica layer (Plate XXXIX). A circular depression being encountered on the east side of the excavation, and fragments of bone awls of about 1 inch in length, very narrow, also being found; it was deemed best to follow the dark soil downward; and still another trench was made at a lower level, and the work again pushed north, exposing two post-holes on the hard pan level, and the outline of the burnt area in profile was determined (see Plate XL). A layer of burnt limestone was observed on the east side.

September 3, 1891. A copper implement was discovered in the position designated G. The letter H shows the log end, heretofore mentioned, and the continuation of the mica layer. Attention has already been called to the fact that the south side of this log was faced by plates of mica placed upright, leaning against it. A similar arrangement was noted on the north side. A skeleton found with the copper implement is No. 167. Skeleton 168 was found near copper awls. Skeleton 169 was near the altar.

September 4, 1891. The principal feature of the day's work was the discovery of several large sheets of mica, which by their position illustrated admirably the manner in which this layer had been laid down. Small fragments of bone awls and bones of animals were added to the collection.

Tuesday, September 8, 1891. A sectional drawing of the mound at the centre stake was made. This drawing gives the exact position of the galena found yesterday and to-day. Some of the galena was covered by the mica layer. As the work progressed still another sketch was made to show where the mica layer terminated on the east side. A layer of small stones is also shown, together with an ash bed and post-hole. A number of bone awls were secured. These were so calcined by fire that they were in several hundred fragments. The thick ends of these needles generally lay toward the north. In the afternoon a skeleton was discovered. It was calcined by fire; near it were copper ear-ornaments, or busks, a copper celt, and a large copper plate. Sketches were made and photographs taken of the copper implements by Dr.

Cresson and Mr. Smith. A small clay altar in which lay some calcined human bones was discovered about 2 p. m. Mica ornaments of circular shape were found near the copper implements (to east side).

September 9, 1891. Work continued on Mound No. 17. Much of interest was found, such as fossil shark teeth and bone disks. Some of the former were saved entire, but others, having been burnt, broke in pieces. Some of the shark's teeth were perforated. The ground plan will give all the necessary details of the work and show the exact position of objects found within the mound. Excavation of this mound was completed this afternoon. The mound is remarkable in that it contained so much mica. The sheets have been estimated at three thousand in number. They filled two barrels when packed for shipment to Chicago. In 1918, one or two of these large crystals, or books were measured by me in Field Museum. Some of them were 50 cm in diameter and 15 cm thick. Many of them were 26 cm by 20 cm. There are also twelve lumps of galena weighing from 12 to 15 pounds, which came from Mound No. 17. Plate XXXIX shows a part of the floor of No. 17 with the mica layer in position.

EXCAVATION OF MOUND No. 18.—Dr. H. T. Cresson had joined our party a few days previously, and on the morning of September 9 he staked off this mound. It was found to be about 75 feet longest diameter by 55 feet east and west, and 3 feet 8 inches in height. There was an altar in it, the base of which was 1 foot 4 inches long, by 1 foot 3 inches in width and $2\frac{3}{4}$ inches deep. The slope leading from the base up to the basin in this altar varied from two to as much as four feet.

On September 10, Dr. Metz and Marshall H. Saville came to camp. Dr. Metz represented Professor Putnam, and Mr. Saville took photographs. In this mound there were some incised human maxillaries (Fig. 10), a platform or monitor pipe, and various layers of different-colored earth. Except calcined bones and a fragment of a skeleton, nothing else of consequence was found. Dr. Cresson made a study of these cut human jaws, giving me the following observations:—

"It will be interesting to mention a peculiar habit of the people who erected the tumuli at Hopewell's farm, that of placing alongside of their dead, ornaments made of the superior and inferior maxillary bones. In Mounds Nos. 3, 18, and 23 at the above mentioned earth-work, the upper jaw was placed alongside of the left humerus about four inches below the articulation of the glenoid process of the scapula.

¹Measurements of objects in the collections of Field Museum of Natural History are given in the metric system. The field-notes follow the English system, and it is thought best to retain them as originally made.

The specimens in question have been in two cases cut across the alveoli a little below the level of the incisor and bicuspid, and in another instance, just above. The work of cutting across the bone and teeth

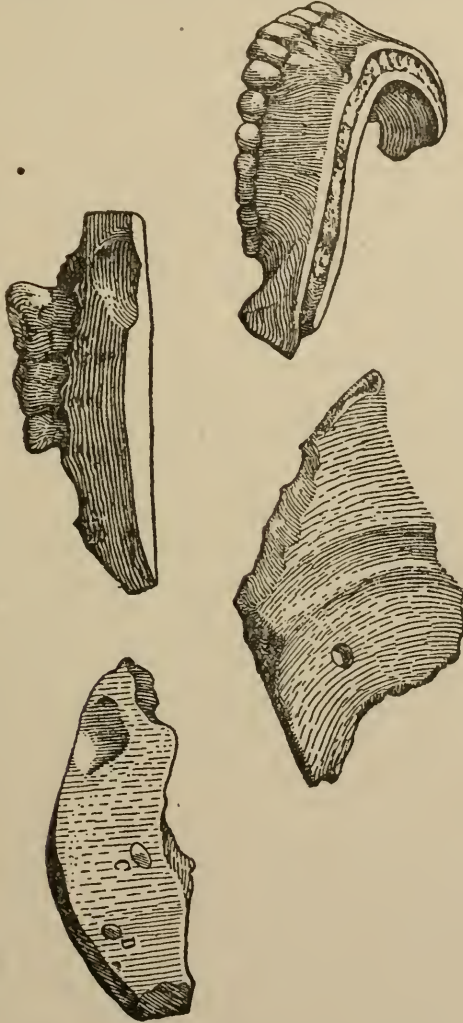


FIG. 10.

Cut Human Jaws and Perforated Cranial Bones from Mound 18.

had evidently been done by some sharp instrument, probably of metal, It has been suggested that the specimens had been sawed across and then ground down, but the incisions are so sharp, and the marks of the

instrument with cutting edge so plain, that we deem this to be impossible.

The mound had apparently been examined, and the altar contents removed by Squier and Davis. The number of the skeleton was 170. We had begun at Fort Ancient to number skeletons for Professor Putnam, and continued the series through the Oregonia work and at Hopewell, in order that there might be no confusion as to where the skeletal remains were found.

EXCAVATION OF MOUND No. 19.—September 14. • The men dug out Mound No. 19, which appears to have been disturbed. This was a small mound 54 by 53 feet and 3 feet high. It contained a rude stone layer and an altar of clay (Plate XLI) in the depression of which were carbonized bones, some human, some mica and galena, fragments of bone implements, and two flake knives. The altar was taken out entire. As it was only partly burnt and not much harder than sun-dried brick, no little difficulty was experienced in removing it. It was not shipped and still lies in the mound, boxed, and covered with three feet of earth. This is mentioned, since the boxed altar may be discovered by some future explorer.

EXCAVATION OF MOUND No. 20.—This mound is one of a group of four, numbered 9, 10, 11, and 20, which form almost a square. It is shown in Plate XLIA. It was about 56 by 50 feet, and did not appear to have been disturbed. On the first day of exploration five skeletons, four adults and a child, were discovered. Two large flat stones, placed side by side, were found just northwest of one of the skeletons, which was badly burned. Copper ear-ornaments and other copper objects were found with several of the skeletons, also circular mica ornaments or disks, and copper cones. No. 176 was the skeleton of a child, said by Dr. Cresson to be about nine years old. With it were found two shell cups, a copper celt, a crescent-shaped copper implement, and copper ear-busks or spools. The positions of the eight copper ornaments found with this child were listed by Dr. Cresson as follows:—

“The first discovered lay on the left iliac bone; the second, 5 inches below the trochanter of the left femur, on the outer side. Another lay just above the left patella. Three others lay around the hand bones, viz., one on the metacarpals of the hand, another on the wrist, and another at the base of the ulna. On the outer side of the left patella was found a busk of copper. Others lay on the metacarpals of the right and left hands. Around the right wrist was a copper bracelet. Outside the left wrist lay a copper celt, with a second half way up the left ulna. Beads, about 250 in all, were found around the neck and at

the base of the right humerus. The head of the skeleton was toward the north. The bones were much decayed and could not be saved."

Large bear's teeth, plated with copper, were found on either side of the lower jaw of skeleton No. 177.

EXCAVATION OF MOUND NO. 21.—This mound was examined on September 17. It was small, and had been previously opened. Nothing was found.

EXCAVATION OF MOUND NO. 2.—According to Squier and Davis, this mound was about 80 feet in diameter and 6 to 7 feet high. Its diameter had been greatly increased by ploughing; and, at the time of our exploration, I should say, it was about 100 feet wide and 4 feet high. Mr. Poole, the oldest resident in the vicinity, informed me that he was there when Squier and Davis opened it in 1845-46, and that they took out about two bushels of disks. In their account (p.158) they estimate that there were about four thousand of the disks deposited. They removed six hundred. The survey worked from September 17 to 21, removing these disks. In Plate XLII they are shown stacked by headquarters' tent. In Plate XLIII a large, shouldered spear and several disks are shown. This shouldered spear-head, which was given to Mr. Hopewell, was the only specialized implement in the entire mound.

Dr. Thomas Wilson of the Smithsonian Institution visited the Hopewell Group in October, 1891, and January, 1892. At that time I had written out a description of the finding of the disks. Dr. Holmes, as stated above in this report, loaned to me Dr. Wilson's notes, which were compiled by him immediately on his return to Washington, but were never published. The following description is taken from Dr. Wilson's report:—

The present or modern height was scarcely two feet above the surrounding level.¹ The ground surrounding it was in Indian corn which had to be purchased and cleared off before operations could be commenced. This being done, the teams, ploughs, and scrapers were turned in on Thursday morning. Before noon, they had scraped away all the surplus earth, and began to find flint disks. The description of Squier and Davis, and what they had found, was soon verified, together with their prophecy as to what would be found. Flint disks were found as they had said; the teams were stopped, and the digging began by hand, when the disks were thrown out on the ground around the mound. They were found piled, a half dozen, more or less, in each pile or handful.

¹He means it was 2 feet high, after our exploration was completed.

and were arranged after the fashion of herringbone masonry. The first pile of a half dozen were set flat on the ground, the disks being placed horizontally; the next pile set on edge, but at an angle at probably 45 degrees; the third would be set in the same way, but cast in the other direction, and the fourth would be again horizontal, and so this was continued over the surface occupied by the plan of the mound. There were two, one atop the other. It is not to be supposed that they were laid with regularity indicated; many of them were thrown out of place, and had destroyed the regularity, but this was the general plan on which they had been placed at the making of the mound. The bottom of the two strata of flint disks was about two feet below the surrounding surface."

We commenced taking out disks Thursday noon and continued until Saturday afternoon, removing the enormous number of 7,232 by actual count. Squier and Davis estimated the number at 4000. The work had been completed at my arrival, and the flint disks were laid out preparatory to marking and boxing, as shown in the photograph.

The following table gives the total of disks from the mound:

Excavated from the mound by our own men	7232
Taken out by Squier and Davis	600
Taken out by Mr. Steel	200
Given Mr. Hopewell, prior to official count	80
Later found upon the surface near the mound	42
From other sources	31
<hr/>	
Total	8185

EXCAVATION OF MOUND No. 24.—This was not a large mound, and seems to have been disturbed (Plate XLIV). Several skeletons were found by us. No. 191 lay about ten feet southwest of the centre stake with the head pointing west. A detached skull was found about two feet from it on the south side. This detached skull (No. 192) was a different type and much inferior in contour with a lower facial angle. The contrast between them was marked. A large shell, probably *Buscyon*, lay near the left arm of No. 191, and two shells perforated in the ends, shell ornaments, and bear's teeth were found with it. The Cat. No. of this skeleton is 40873; that of the detached skull, 40169. A charred skeleton, near whose wrist-bones were two copper ornaments, was found on September 25, and the next day two more skeletons were discovered. The latter were on the base line of the mound, 3 feet, 6

inches from the surface. The lower jaw and right radius of one of these (No. 195) were missing. Two other cremated skeletons were found in this mound, likewise some small shells and mica ornaments.

EXCAVATION OF MOUND No. 23 (Plate XLVI).—This, except for No. 25, was the largest mound opened. It was reduced to within four or five feet of the base line with teams and scrapers. It was originally 150 feet long and from 10 to 12 feet high. Plate XLV shows the mound just before we began exploration. The excavation of this mound occupied the expedition from September 23 to October 10, while work upon it was continued until the 20th of October.

On the 23rd of September, seven skeletons were discovered, as follows:

No. 184. Head west, no ornaments. Bones could not be saved.

No. 185 (Cat. No. 40170). Female, head S. S. E.

No. 186. Boy. Bones crushed by weight of earth. With this skeleton were five stone celts, an arrowhead, cut jaws of the fox and lynx, and some bone points.

No. 187. Old man, head southeast. No ornaments; one bone awl.

No. 188 (Cat. No. 40171). Brachycephalic head. Head E. N. E., left humerus perforated.

No. 189 (Cat. No. 40166). Head S. E.

No. 190 (Cat. No. 40172). Head S. E.

September 24. As the excavation proceeded downward, one noticed the difference in color between the different layers of earth in the mound, and these patches of different-colored earth suggest that it had been dumped in small quantities. Ashes are noticeable at the west end of the mound. Some skeletons were found in gravel. This gravel predominated in quantity at the east and especially toward the south side.

September 25. Large holes or pits were discovered in the north side of the west end of the mound. Another was found near the centre of the east end. Whether these are due to previous excavation, we are unable to say; but they do not appear to have been made by Squier and Davis. During the time between September 25 and October 1, a number of finds were made. Two altars, shown in Plate XLVI, were discovered 10 feet below the surface. One measured 27 by 22 inches, being $4\frac{1}{2}$ inches deep. These altars contained nothing, which is unusual in a mound so large.

A number of skeletons were found at the following depths:

Cat. No.	Field No.	Depth below Surface Feet
40190	197	10
	198	8.9
40187	199	10
	200	10
	203	10.9
	204	10
	205	10
40185	205	10
40186	206	9.9
	207	9.9
	208	10
	209	11

It was remarked that many of these skeletons were charred. Some of them had been laid on stone hearths, others directly in the fire, and still others upon baked clay, which was sufficiently hot to char the parts, the parts underneath leaving the chest and upper bones intact. Skeleton No. 199 (Plate XLVI) was found near an altar. A large ocean shell and two copper plates were with it. A portion of a leather garment sewed with twisted fibres was still sticking to one of the plates. Mr. Willoughby observed a mould of the cord of leather or sinew between the holes in the plate. He thinks that this will shed light on the method of fastening plates to the person. Skeleton No. 207 had copper ornaments near the radius on each side, and a number of pierced wolf and fox teeth (506) around the neck. It required at least one hundred and twenty-seven of the animals to make such a necklace. With skeleton No. 209 were found a copper plate, two pipes, pearl beads, two bear's teeth ornamented with pearls, and others with holes which may have originally contained pearls.

It is worthy of note that skeletons Nos. 197, 203, and 206 had been charred by fire and the bones covered with a dendritic deposit from the iron in the soil above. Some of this deposit resembled breccia from European caves. The iron breccia of this mound was so hard that we were prevented from removing skeletons except in fragments.

On the 1st of October thirteen skeletons were unearthed by the workmen, viz., Nos. 210—222 inclusive. No. 213 was especially noticeable on account of the objects found near it. One bone bead and a quantity of pearl and shell beads were recovered, while a number

of very small pearl beads, about one-sixteenth of an inch in diameter, were still retained upon the original string of twisted vegetable fibre. Two uncut bear's teeth and three cut ones, one of which had been cut in several pieces, were found. A copper plate was also found, likewise four ear-ornaments, one on either side of the head and one in each hand. Pieces of finely woven textile had been preserved by contact with one pair of these ear-ornaments, the cloth adhering to one side of the ornaments, being coarser than that on the opposite side. Upon one side of the plate, the curling hair of some animal, probably the buffalo, has been preserved by the salts of copper, and a mould of what may be human hair is seen on the other side. Near the head of the skeleton was a set of teeth (superior maxillary), which had been cut across just above the alveoli. It will be remembered that another pair of jaws was found in Mound No. 18 in which the same peculiarity was remarked. Mr. Acton, who gave many specimens to Squier and Davis, states that he also remarked this peculiarity, and that thigh-bones were also "decorated with queer designs and plated with copper." The skeleton (No. 213) was covered by an immense bed of clay and gravel at least 10 feet thick, and was so badly crushed that it could only be removed in fragments. The feet were missing. Some of the skeletons, on the lower level, rested on stones showing traces of hot fires, and were slightly charred on the side in contact with them. This suggests that they were laid on the hearths after the stones had been considerably heated and the ashes raked away. Other skeletons were found in the same condition noted in a previous day's work, being covered with a cinder-like incrustation and very brittle. In the afternoon, Mr. Williams found a shell cup 4 feet, 6 inches east of the centre stake at a depth of 8 feet, 9 inches.

On the 2nd of October, five fragmentary skeletons were found; all according to Dr. Cresson, of brachycephalic type. Between October 10 and 20 the exploration of this mound was completed. Skeletons Nos. 223—236 were discovered together with a number of objects which it is not necessary to describe. It was observed that practically all the skulls were crushed, probably because the bodies rested on the hard floor to which we have previously referred. In some instances the crania was absolutely decayed, leaving an oval white streak in the ground. The teeth, however, were preserved. Dr. Wilson was present during the exploration of this mound, being particularly interested in the numerous depressions commonly known as post-holes. He says of these, "Although there was none or but slight appearance of posts, the holes were such as would have been made had the posts been stood

up or driven in; then being covered by the mound in the course of time they rotted away, leaving the holes. The earth had not caved in around them. A few traces of decayed wood were to be observed. These post-holes were from 4 to 6 and 8 inches in diameter and from 2 to 3 feet deep. They were in groups of five or six, and apparently two rows of them. It was difficult to determine their position with exactness. The appearance of these post-holes indicated or suggested that logs or posts of wood had been driven in to make a surrounding vault or protection for the body, and for the funeral objects which were deposited with it. Following the trench as it was cut down, it was remarked that this particular mound showed that which was remarked of other mounds by Squier and Davis, and others, that at two or three feet from the surface, apparently extending all around the conical form of the mound, there had been a layer of white sand or fine gravel from one to three inches thick, and then the mound had been heaped over this to a depth of three or four feet. In the centre at the top of the mound, this white sand or gravel was about 2 feet below the surface, but at the edges it was as much as 5 feet below the surface. due probably to the ploughing and erosion. This streak of gravel was regular and continuous, and could only have been made by spreading the gravel over the mound, after it was thus far completed. The layer of earth which was on top of the sand or gravel, the stratum which was 2 and 5 feet, as mentioned, must have been put on at some subsequent time, but how long subsequent, no one can possibly tell. For the most part, this strip of sand or gravel showed the mound to have been a complete or perfect cone, but in some places on the sides and around the edges there were depressions and changes from the regularity of the cone. Other mound investigators have remarked this layer of sand or gravel. Squier and Davis mention various instances. Like many other peculiarities of the mounds, they are alike in general features and yet differ much in details. The layers of sand and gravel differ naturally with the various localities from which they come. They differ in number, for sometimes there may be only one such layer, and other times three or four. Sometimes they extend in a regular and continuous layer over the mound, and at others they are broken and irregular. Sometimes they are of sand, other times of gravel, and again are of small boulders, etc."

Students unacquainted with the exploration of large mounds would naturally suppose that in numbering a series of skeletons or deposits we would begin at one end of the base line and number the skeletons in order of their position. This was done wherever practicable, but it is

sometimes impossible. Many interments are made in loose soft soil, and, in case of rain, the water collecting in the trench seeks the depressions in which the skeletons lie, and is liable to ruin the skeleton and the more fragile objects with it. The skeletons were therefore removed as soon as possible and numbered in the order found. At times when teams and scrapers were being used on Mound 25, later to be described, the shovelers were employed in digging out several small mounds.

EXCAVATION OF MOUND NO. 3.—In this mound we found an altar whose contents had been removed, probably by Squier and Davis, a copper celt, small knives, and a few other objects. The celt was concave on one side and convex on the other, and so finely made that it seems almost impossible that it could have been fashioned by the cold hammering process. The metal shows the peculiar reddish orange color of copper that has been fired. Other copper implements found in the group are very highly finished and show the same color below the incrustation. In most cases the laminar structure of cold beaten copper seems to be absent. These celts, however, may have been associated with charred human bones.

EXCAVATION OF MOUND NO. 9.—The road had been cut through this mound so that little was left. Squier and Davis' finds in it are interesting, particularly their discoveries of obsidian. In their report (p. 155) they write as follows:—

"It will be seen that this mound has several peculiar features. The altar A, instead of occupying the centre, is placed considerably toward one side; and a layer of charcoal (C) fills the corresponding opposite side. Over the altar curves a stratum of sand, and over the layer of charcoal still another, as exhibited in the section. This altar was the smallest met with. It was round, not measuring more than 2 feet across the top. It was nevertheless rich in remains. Within it were found:

(1) Several instruments of obsidian. They were considerably broken up, but have been so much restored as to exhibit pretty nearly their original form. Too large for arrowheads, and too thin and slender for points of spears, they seem to have been designed for cutting purposes.

(2) Several scrolls tastefully cut from thin sheets of mica. They are perforated with small holes, as if they had been attached as ornaments to a robe of some description.

(3) Traces of cloth, small portions of which, though completely carbonized, were found, still retaining the structure of the thread.

This appeared to have been made of some fine vegetable fibre. It was what is technically termed 'doubled and twisted,' and was about the size of fine pack-thread.

(4) A considerable number of ivory or bone needles, or graving-tools, about one-tenth of an inch thick. Their original length is not known. Several fragments were found two and three inches long. Some have flat cutting points, the points of others were round and sharp; some were straight, others slightly bent.

(5) A quantity of pearl beads; an article resembling the cover of a small vessel, carved from stone; also some fragments of copper, in thin, narrow slips.

"There were no relics of any kind found amongst the charcoal. The layer of this material was not far from six feet square. It had been heaped over while burning."

MOUND No. 5.—In this we found nothing of consequence. Yet in 1845 it was an important mound, on which Squier and Davis report as follows:—

"In this instance the altar was covered with stones; and instead of the usual sand stratum, there was found a layer of large flat stones, corresponding to it. The altar A was composed of earth elevated two and a half feet above the original level of the soil, and was five feet long by three feet four inches broad, the sides sloping at an angle of nearly 30 degrees. It was faced on the top and on the sides with slabs of stone, quite regular in form and thickness, and which, although not cut by an instrument, were closely fitted together, as shown in the supplementary section of the altar A. The stone is the Waverly sandstone, underlying the coal series, thin strata of which cap the hills bordering these valleys. The altar bore the marks of fire; and a few fragments of the mound-builders' ornaments, a few pearl beads, etc., were found on and around it. The original deposit had probably been removed by the modern Indians, who had opened the mound and buried one of their dead on the slope of the altar. The stones composing the layer corresponding to the sand stratum were two or three feet deep, presenting the appearance of a wall which had fallen inwards."

EXCAVATION OF MOUND No. 8.—Three fragmentary skeletons were found in this mound. The field-notes mention that more than half the bones were missing. With skeleton No. 241 there were large sheets of mica. A short distance away was found a nodule of Tennessee flint which weighed between 20 and 30 pounds. The disks found in Mound

No. 2 were of this material, but this was the only complete nodule found during the exploration of the Hopewell group.

MOUND NO. 11—This mound was not explored, as it was in the yard of Mr. Beard, tenant of the Hopewell estate, and he requested that there be no disturbance of his lawn.

EXCAVATION OF MOUND NO. 25.—It was well toward the middle of October when we completed the exploration of Mound No. 23 and filled the excavation. I find in the field-notes that the owner, Mr. M. C. Hopewell, was exceedingly kind and courteous. Our teams dropped earth about his clover fields and destroyed crops, yet he entered no complaint. It had been stated by one or two archæologists and, I believe, by a geologist as well, that Mound No. 25 was too large to have been the work of human hands. When Dr. Wilson visited our camp for the first time, we discussed whether it should be explored. At Dr. Wilson's request, a large shaft was sunk in the centre of the mound. In his report he states that it was 6 feet deep; but, as I recall it, it was about 10 feet deep. At the bottom of the shaft we found charcoal and ashes, proving that the elevation was artificial.

It is very easy in these days of liberal appropriations for field operations to negotiate the examination of large mounds, but up until the time of the Hopewell survey no mound more extensive than No. 23 had been fully excavated by any one. In fact, more actual work was done on the twenty-two mounds of the group than has since been applied elsewhere by other observers. This does not imply that single tumuli, or even several of them, have not been trenched and hand-troweled more extensively. On the contrary, Mr. C. B. Moore's work in the south and much of Professor W. C. Mills' labors in Ohio were carried out more slowly and in greater detail.

While the men were leveling Mound No. 23 and excavating Mounds 3, 9, and 5, the teams were put to work on Mound 25. The larger end, which was 23 feet high, lay to the east. Plate XLVII is a copy of the original outline map prepared by Dr. Wilson and Clinton Cowen, after exploration. The only change I have made is to call the elevation of section 1, 23 feet. This is exact, and was obtained by measuring from the bottom of our trench to the highest point. In view of the heavy expense involved and the uncertainty as to what the mound might contain, it was decided to work No. 25 in sections or trenches, beginning at the eastern end. After running the first trench, we would skip the next sector (7) and trench 2, omit the next, and take 4. In this way we would be able to determine the character of the mound and not expend money without results. After completing trench 4, which was some

distance from the western end of the mound, we dug out trench 6, which lay between sectors 3 and 2. The last sector, 7, which was between 1 and 2, was not excavated, neither was section 5. About one third of Mound 23 thus remains unexplored. This explanation is necessary in case the Ohio State Archæological Society should complete the exploration at some future time. Rain and snow caused great inconvenience in moving the earth, particularly at the north and south ends of the cuts. Here the earth became mud, and it is quite possible that we did not remove some burials in the southern extension of one or two trenches.

From October 24 to 28 I was called to Cincinnati and Xenia. During this period Dr. Cresson had charge of our work. This is here mentioned, since there is some uncertainty with reference to the extent of the two boulder mosaics or effigies found on the south and southeast slope of Mound No. 25. The first section in No. 25 was made at the highest point (23 feet), and the cut was about 50 feet wide at the top, and varied from 33 to 38 feet wide at the bottom. It was necessary to make the sides sloping, otherwise the earth would cave in, as it was loose. The scrapers turned up a number of boulders, such as had been previously found in Mound 23, and some layers of coarse gravel appeared. The persistent number of these boulders and their more or less uniform size led Dr. Cresson to examine more carefully. They lay from 18 inches to 3 feet below the surface. The boulders themselves were evenly laid, but the variation in the thickness of covering soil was due to the cultivation of the mound by farming. In the light of modern scientific work, one may say that the top soil should have been removed for a distance of two hundred by a hundred feet, and these boulder mosaics uncovered and studied in detail. Yet, this could not have been done for the reason that it would involve great expense and delay. Furthermore, as stated above, Cresson did not realize their importance until they had been considerably damaged by the teams. Dr. W. H. Holmes visited the site when they had been partly removed, and again on his way east about October 29. On my return I saw such as remained of these, being a portion of the leg, tail, and neck of the animals. Cresson states that they were about a hundred feet in length. He executed a drawing of them with detailed measurements. Two or three local newspaper notices of our work, published at the time, refer to the boulder mosaics. An outline sketch was presented by me in the *Antiquarian* of September, 1897, but is not sufficiently accurate to warrant reproduction here.

On November 3, the bottom of cut 1 in Mound No. 25 was reached;

nothing was found, save a unio shell and fragments of human tibia. The field-notes state, "The boulder mosaics have, however, amply repaid for the trouble and expense." It is most unfortunate that a plan of them is not available for reproduction. The work in the first section in Mound No. 25 was expensive, and there being no results, I at once consulted with my friend, Dr. Thomas Wilson. He advised that we omit the next cut (No. 7) and take No. 2, which lay some distance toward the west (Plate XLII). This was done. Teams were put to work, and the shovelers transferred to smaller mounds.

November 12. The second cut in Mound 25 had reached a point but three feet from the base line. Decayed skeletons noted in several places in the course of sinking experimental shafts led us to exercise great care. Abandoning teams, we put in the men with shovels, and completed the examination of the remainder of the cut by hand. In this cut (as in the east-end section), hundreds of small masses of various colored earths were observed: short, irregular layers of sand also extended in various directions. A very singular feature in the mound (alike in detail with No. 23) was the partially hollow pits or holes having dome-like roofs. It seems that the builders erected little frameworks of small poles, bent together at the top, and enclosing a space of the size of an ordinary tobacco hogshead, over each skeleton. The earth was heaped above. In the case of weaker domes, the weight of the earth above would crush them flat; but some of the structures were composed of two or three inch saplings, and resisted the pressure for many years. Then they caved in. As the earth above had become more or less caked or hardened, an arch was thus formed; and in many instances the earth had not completely filled these hollows. The horses engaged in scraping broke through one of these holes, and were imprisoned up to their necks for several minutes, as some of the peculiar dome-shaped affairs were several feet in height and diameter.

We now present the notes on excavation of cuts 2, 3, 4, and 6. With few changes or expansion, these were taken from Dr. Dorsey's copy of the original field-book. It is possible that all of the material was not taken out of cut No. 6 or cut No. 4. The fact will be determined when the exploration of the mound is completed at some future time. The walls frequently caved in, due to winter rains, and the work from November 20 to February 10 was carried on under great difficulties. Previously, no survey had conducted explorations through an Ohio winter.

On November 12 about 8 a.m., the second cut reached a depth of about eighteen feet. This was near the bottom, and four skeletons

(as shown in Plate XLVIII) Nos. 242, 243, 244, and 245, were uncovered. At this point we reached a concrete of small gravel stones which had been cemented together by the infiltration of iron from the soil above, forming thick sheets and slabs through which it was almost impossible to penetrate. This being removed by dint of hard labor, what may be termed a mosaic of red, yellow, and purplish colored earth was encountered. These masses of earth were so numerous, and of such definite shape, that, after a careful examination, we have come to the conclusion, that they were intended to represent certain forms and, although larger and much cruder, were probably not unlike the sand paintings made by the Navajo and some other tribes.

When this earth had been removed, three skeletons, Nos. 242, 243, and 244, were found. Nos. 242 and 243 lay together upon a raised bench of hard baked clay 8 feet, 5 inches long and 5 feet, 10 inches wide. The bench was surrounded by a gutter which varied in width on the different sides. Its maximum width was 1 foot, 4 inches; and its minimum, 7 inches, with a depth of from 3 to 8 inches. This gutter was filled with a peculiar mixture of brown clay and ashes. Outside the gutter were four post-holes, irregularly arranged, which were 6-8 inches in diameter and 2-3 feet deep. Skeleton No. 244 lay on a similar bench which was connected with the one just described. The dimensions of this bench were 8 feet, 4 inches by 3 feet, 9 inches, and it was surrounded by a gutter of baked clay filled with clay and ash, as in the preceding example.

An interesting series of implements were found in connection with the two burials. No. 242 had a large pile of beads, pearl and otherwise, lying beside the head, a round ball and spoon-shaped ornament of copper in the right hand, and a spool-shaped ornament of copper near the left femur. No. 243 had a large copper plate, badly broken, on the left side of the head, a number of beads on the right side of the body, a spool-shaped copper ornament near the left femur, and a ball and spoon-shaped ornament of copper in the left hand. A few beads were found on the left side of skeleton No. 244. It was evident from the position of the post-holes associated with the benches that small structures had been erected over them, probably to protect the dead during the building of the mound. A little south and west of the benches there were traces of a fireplace 7 by 7 feet, the cinders being about 6 inches deep. West of this fireplace, upon its outer edge, there was a small mosaic of fine stones. About 4 feet, 8 inches south of the fireplace was a layer of stones in the form of a semi-circle. 9 feet southwest of this was discovered still another layer of stones which had

been laid with so much regularity that it was impossible not to remark its intentional shape. It seems evident that mosaics of many definite shapes were built at the base of these mounds, although hitherto these have been generally overlooked by archæologists.

Other skeletons found in this section were:—

No. 245. This lay beside No. 246, the heads of both being toward the west. A flint knife lay under its head, many beads around the neck, and a few on the wrist. A beautiful bone awl and some polished bone piercers lay beneath the hand. With No. 246 were two spool-shaped copper ornaments and many beads. Both skeletons lay in soft earth, on the base line.

No. 247 (Cat. No. 40167) lay with the head toward the west. With it were found a copper spool, cut and polished bear's teeth, many large beads, peculiar bark, and some other objects of interest.

No. 248 (Cat. No. 40151) lay with the head southeast. Another skeleton, with the head in the same direction, lay to the west of it. The skeleton, which was badly decayed, was 5 feet, 11 inches long. Associated with it were some very remarkable objects. At the right shoulder lay a large platform pipe and a beautiful agate spear-head. A copper plate lay on the breast, and another on the abdomen, while a third lay under the hips. These plates, when lifted, were found to have preserved not only cloth and sinews, but portions of the muscles of the individual. Cut, sawed and split bears' teeth covered the chest and abdomen, and several spool-shaped ornaments and buttons of copper were found among the ribs. The body had apparently been dressed in a cloth garment, extending from the neck to the knees, upon which had been sewn several thousand beads, some of pearl and others of shell. Upon the skirt of the garment had been sewn some of the largest and most beautiful pearl beads found in any of the mounds, together with bears' teeth, etc.

The head had been decorated with a remarkable head-dress of wood and copper (Plates XLIX and L, and Fig. 11). The mass of copper in the centre was originally in the form of a semi-circle reaching from the lower jaw to the crown of the head. It had been crushed flat by the weight of the earth, but part of the original contour was still apparent. The antler-shaped ornaments were made of wood encased in sheets of copper, one-sixteenth of an inch thick. They originally had four prongs of nearly equal length. Willoughby says with reference to this object:—

“The carved head-plate had been flattened and broken, and the

antlers turned back by the superincumbent weight of earth. The head-plate was originally of the form illustrated in Fig. 12*a*, and covered the head from the forehead to the base of the skull, and the branching antlers probably rose perpendicularly. In the construction of the antlers the aboriginal artisan first selected limbs having the proper curve and the required number of branches similarly arranged. These

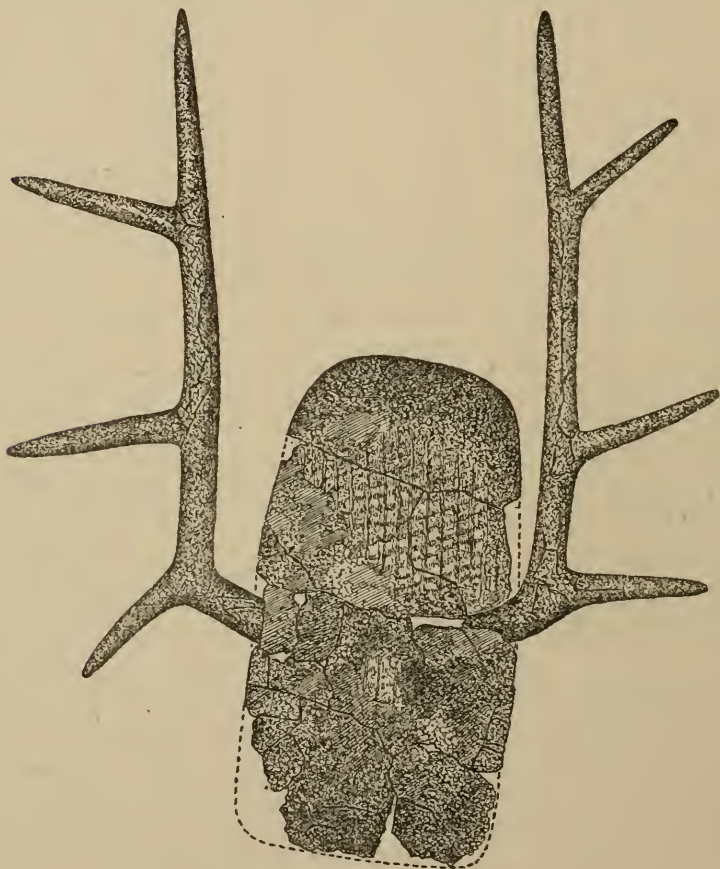


FIG. 11.
Head-dress on Skeleton 248.

were cut to a suitable form and carefully covered with thin copper. The bases of the antlers were perforated laterally and secured beneath the head-plate."

Eleven skeletons (Nos. 249-259) were found in Section 2, with which there were no objects. All were extremely decayed and could

not be preserved. Section 3 was reduced to within 5 feet of the base line with scrapers. Various patches and masses of colored earth were observed, as in previous excavations. There were many layers and deposits of gravel, some long, some short, and all more or less curved. Near the centre of the section, 4 feet from the base line, were found one hundred and twenty pieces of sheet copper. They were all laid flat, and occupied a space 3 feet long by 2 feet wide, with layers of bark above and below. There were no skeletal remains connected with this deposit, nor was any altar found near it. The bark was exceedingly

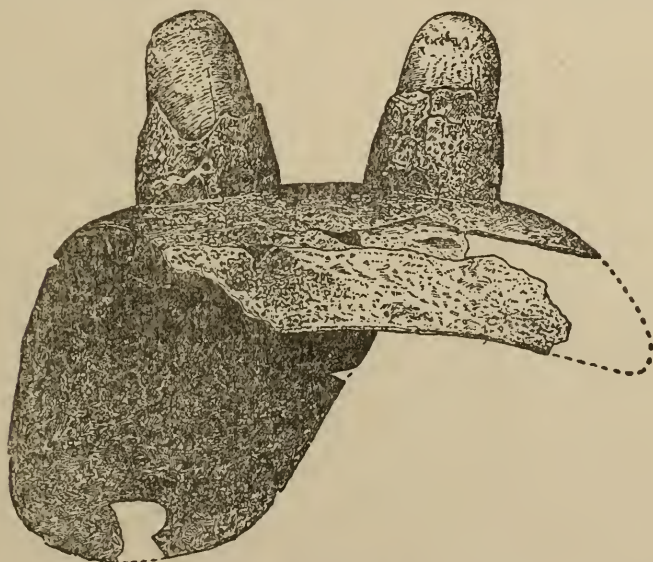


FIG. 12a.
Head-dress of Copper from Skeletons 260 and 261.

fragile and crumbled, notwithstanding our efforts to preserve fragments. Many of the plates were worked into various patterns. Very few of them were of forms known to exist in Ohio, the greater part of the designs being unique. The field list is as follows: A long mass of copper covered with wood on one side, squares and five other traceable things on the reverse; eighteen single copper rings, two of which are small; double copper rings; one set of three and one set of two; five saucer-shaped disks; saw-shaped design, arrowhead, and other unknown things massed together; one combination design of circles and bars; smaller mass of copper, wheels, etc.; two fragmentary fish, and one whole fish resembling the red-horse; two diamond-shaped stencils of copper; three long copper plates, one of them perforated; two swastika crosses; four

copper spool-shaped ornaments, two with four holes in each; one mass of ten little copper circles; four comb-shaped or bear effigies; two spoon-shaped pieces of copper; forty pieces of copper, squares, circles, etc., many fragmentary; eleven pieces showing semi-circles, straight edges, squares, etc., one small cross (with two arms).

The deposit was photographed in mass, as the edge of a scraper had caught and turned over several of the plates, but a careful examination indicated that they were not placed in any special position, being simply put down after some interments below had been placed. Two skeletons, Nos. 260 and 261, lay together near the base line with the heads west. The mass of material deposited with them exceeds that associated with any other burial so far discovered in the United States. The objects were laid so as to form a rectangle 7 feet long and 5 feet wide, and were frequently so closely spaced as to overlap one another. The most remarkable find was a copper celt 22 inches long, which weighed 38 pounds. In spite of its size it was very symmetrical.

The objects covering the two skeletons were as follows: Sixty-six copper celts, ranging in length from $1\frac{1}{2}$ to $22\frac{1}{2}$ inches; one stone celt, 11 inches long; twenty-three copper plates, mostly fragmentary, and a great number of pieces; one very large jaw; a curious copper head-ornament; a broken shell; some very fine pearls, pearl and shell beads, and teeth; carved bones and bone fragments; effigies; meteoric iron, partly worked copper, etc.; and colored earth. Several other burials were found in Section 3. No. 264, an adult, lay with the head east. A copper celt lay under the head, and another under the right hand. A flint drill lay beside the head, and a number of beads around the neck. A mass of partly hammered copper lay by the left side. The finding of a drill with a burial seems to be unique. Finely woven cloth and fragments of bark adhered to one of the celts.

Skeletons Nos. 265 and 266 lay side by side on blocks of earth surrounded by trenches. Their heads were west, but the skull of No. 266 was missing. Under the head of No. 265 there was a fragmentary bird-like (eagle?) effigy of copper. Fine fur adhered to its surface. Several of these bird effigies of thick sheet copper were found in Mound 25, but cannot be restored. Willoughby thinks they consisted of a head and neck, the latter ending in a handle. Skeleton No. 267 lay with the head west. A copper ear-bob and a few beads were found with it. Skeleton No. 268 (Cat. No. 40178) lay with the head to the west. A few beads were found, while a copper plate lay under the hips. On the perforations of this plate were a few small mica scales, possibly remains of ornaments fastened to the plate.

"Above and below the perforations is a crescent-shaped mark caused by the contact of some substance other than mica. To the inner edge of one of the perforations a cord of sinew still adheres, and near the corresponding edge of the other hole the marks of a similar cord appear. This cord of sinew may have attached the plate to the person, or may have served to fasten the small ornaments to the copper plate. Upon the reverse side of this plate pieces of leather adhere, and the impressions of cloth are to be seen in the copper salts. This specimen shows very clearly the laminations caused by hammering."

Other burials were:

No. 269 (Cat. No. 40179). Head west. Shell, copper plate, and beads near head.

No. 270. Head west. Around the skull a copper axe, two hundred beads, cut mica ornaments, bear's teeth with pearls inserted in them, decayed bark, and a copper plate.

No. 271. Head west. A few beads and a piece of mica.

No. 272. Head north. Partially cremated. No objects.

No. 273. Head north. No objects.

No. 274. Head west. Two copper ear-bobs and a stone celt.

No. 275. Head north. No finds, but pieces of coal, sheets of mica, and a small pipe were found in an ash pit near it.

No. 277. Head north. Copper plate under head.

No. 278. Head east. The remarkable incised portion of a human femur, shown in Plate LXXXII, No. 1, was taken from beside the head of this skeleton. A pair of shell ear-pendants was found near the neck. It is interesting to note that a similar ornament is represented in the lobe of the ear of the carved human figure illustrated in Fig. 68. A number of small pearl beads, two copper ear-ornaments of the usual form, several perforated bear's teeth, two of which were inlaid with pearls, and the large, finely executed imitation bear's tooth of antler (Fig. 58, on p. 159) were also obtained with this skeleton. There was also a remarkable human effigy of cannel coal.

Five additional skeletons were found in the banks of Section 3 on the base line. The banks had to be considerably undermined to get them out; and for this reason one of these burials is shown in the edge of Section 6, three in the edge of Section 5, and one in the north end of Section 3. No. 279 lay with the head west. Three sheets of mica were under the skull, three lumps of galena on the shoulders, and a small pyrula shell near the hips. No. 280 lay with the head south. The skeleton had almost disappeared, but was evidently that of an adult. A number of beads were around the neck. No. 281 lay on the edge of

Section 5, near No. 283. The following objects were found with the former: Three copper plates, one of which lay beneath the hips, another below the shoulders, and a third under the head, two of these, being the largest found; a copper helmet-shaped head-dress; copper ear-ornaments; a clay hemisphere covered with metal; a number of copper beads, the first found in this mound; a finely carved section of a human femur; a portion of a delicately wrought ornament of tortoise shell (Fig. 12*b*). The same carved form appears upon both sides of this fragment, which represents but a small portion of the object. Unfortunately, the remaining portion of the carving is so badly disintegrated and broken that it is impossible to ascertain its original outline. Articles cut from tortoise shell have also been taken from the Turner group of mounds, and from the stone graves of Tennessee. A number of other objects were scattered irregularly over the chest.

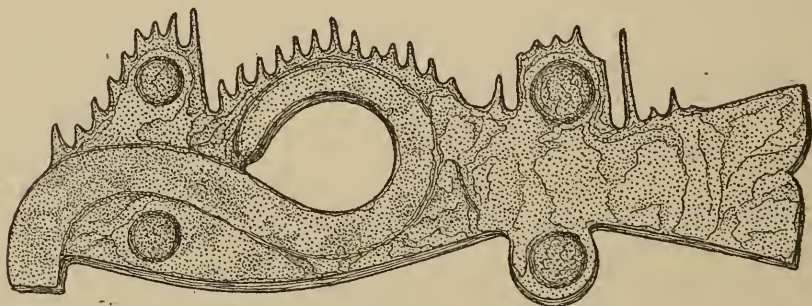


FIG. 12*b*.
Ornament of Tortoise Shell Found with Skeleton 281.

A bird effigy and an effigy of an otter or beaver, both carved in bone, were found by the side of the head. The following description of these objects is taken from the notes and observations of C. C. Wiloughby.

The hollow effigies of the same class, as those later to be described and illustrated, were taken from near the head of the skeleton. The one shown in Plate LXXXIII, No. 1, has the notched raptorial beak and uncovered cere of the hawk. The eye cavities are large, and probably contained pearls. The incised lines indicating the feathers of the wings and tail are even and well cut. Unlike most of the carvings of this kind, the back is not perforated, but a hole was drilled upon each side, about one-eighth of an inch from the lower edge, near the outline of the wing. Plate LXXXIII, No. 2, is a drawing of the other hollow carving. It represents a quadruped carrying in its mouth a roseate spoonbill

(compare the head of the bird with that in Plate LXXVIII, No. 2 and Fig. 63). Two incised ovals are cut in the back of the animal, and another is present upon the upper side of the tail. These oval figures are probably analogous to similar elliptical forms common upon the backs and above the head of animals which appear in the incised carvings of the Ohio Mound Builders. The head and beak of the bird, its somewhat conventionalized wing, and a part of the tail appear on the side shown in this drawing. Two perforations extend through the back of the animal and open into the interior cavity of the effigy. The relative size of the cavity is shown by the oval line in Plate LXXXIII, No. 3. The bird wings are turned back between the animal's legs. The neck of the bird extends along the quadruped's head and neck, and disappears beneath its body. The continuous outline of the spoonbill is indicated by wide incised lines upon the under side of the carving and within the cavity. These lines are represented by heavy lines, and the broken lines show that portion of the bird appearing upon the sides of the carving."

Skeletons 283 and 284. Nothing was found with either of these. They lay in the edge of Cut No. 5, with heads to the north. As in the case of nearly all skeletons in the mound, they were utterly decayed.

The first altar found was in Section 3, about 28 feet north of the copper find and upon the base line of the mound. It was evident that a quantity of wood had first been placed in the basin of the altar, and that the earth had been heaped over it and the objects, while it was still burning. Thus, although the contents of the altar were badly charred and burned, not all the objects had been destroyed. The objects had been heaped in the cavity of the altar without any regularity of position, and included mica ornaments, spool-shaped copper ornaments, copper balls, many other copper objects, large beads, bear's and panther's teeth, carved bones, several effigies carved out of stone, stone tablets, slate ornaments, beautiful stone and terracotta rings, quartz crystals worked in various forms, flint knives, and cloth. The heat of the fire had evidently been intense, for much of the copper was melted and run together.

Section 4. Skeleton 262 was found only 18 inches below the surface in this section. A large stone celt lay near the neck. It is highly probable that it was an intrusive burial. Skeleton 263, that of a child, was found near the surface on the north side.

Skeleton 276 was found on the base line. There were no objects with it. The floor of this section presented the same appearance as that of Sections 2 and 3, being burned hard, but no platforms surrounded by

trenches were found. Ash-pits about 10 by 12 inches and post-holes full of decayed wood were numerous.

Section 5. Skeleton 285 lay in the bottom of Section 5, head to the north. There were no objects with it. Skeleton 286 lay upon the east side of Section 5, somewhat under the bank of Section 3. There were between two and three hundred beads around the neck, and ocean shells at the head.

Section 6. This section lay between Sections 2 and 3, and promised to be very rich. The following skeletons were found on the base line:

No. 288. West side of section. Badly decayed. No objects.

Nos. 289 and 290. Centre of the section. Both lay with the head toward the east. Boulders to a thickness of 14 or 15 inches had been laid over the bodies. At the heads, boulders the size of a man's fist had been arranged in arch, sheltering the skulls, which were fairly well preserved. A peculiar substance similar to resin or gum was found upon the shoulder blades of one skeleton. The earth below the skeletons was burned hard and covered with a thin layer of charcoal. Several hundred beads were found around the neck of No. 289.

Second Altar. This altar was found in Section 6, and its removal completed the work at Hopewell. The objects found in it had been heaped above the fire, as in the altar previously described. It was somewhat larger than the latter, and included more objects. Most of the finds were of the same character, but in addition it contained obsidian and some fine pipes.

Most of the skeletons were found on the north side of Sections 2 and 3, only 8 to 12 feet from the surface and under layers of gravel or earth. The centre of the mound contained gravel and clay strata which, for a certain distance, did not conform to the slope of the structure. The proportion of the different materials in the mound was estimated to be as follows: Clay 45%, loam 20%, gravel 13%, sand 5%, white clay 5%, burnt earth 5%, charcoal 1%, stones 1%.

Our first inspection of Mound 25 led us to believe that it represented the human trunk; but we later concluded that its form was due to additions, which had been made to the mound at various times, and that it was not intended for an effigy.

It seems to me that Mound 25 was the result of gradual development. It is probable that a number of interments were first made, the small wooden pens or dome-shaped structures erected, and mounds built over these. The first completed structure was approximately 150 feet long, 80 feet wide, and about 14 feet high. Later it was made

into an elevated platform, as the earth layers indicate that the top was flat for a considerable distance.

The deposits of sheet copper, and also the deposits of axes and celts, were apparently made after the original smaller mounds were completed. Indeed, they were placed on the hard burnt floor subsequent to some of the burials. It seems also that No. 248 and a number of other skeletons north of the centre of the mound were placed there, after these first interments had been made. This is based on the fact that many of the layers seemed disturbed or broken, as though the Indians had dug down four or five feet through the original slope of the first mounds on the north side. Having made these interments, they heaped dirt above to a height of from 8 to 14 feet. How long a period elapsed between these various interments it is impossible to state, but the evidence indicates that the Hopewell group was occupied for a considerable length of time. The number of mound interments and objects is of such character as to indicate that the place was occupied for at least a hundred years. I do not think that the peculiar character of Mound 25 can be explained on the theory that all the interments and the amount of labor necessary to erect such a structure were due to concentrated effort on the part of the villagers during a few years of occupation.

II. STUDIES OF THE OBJECTS FOUND IN THE HOPEWELL MOUNDS

A study of the various objects found in the mounds of the Hopewell group will be presented under fourteen subdivisions. It has not been possible to always adhere strictly to the material under discussion in a given section, as, for example, when speaking of copper, it is sometimes necessary to refer to bone and shell also.

METAL: COPPER OBJECTS.—In the course of a general review of the bulk of the material found during these explorations, the observer is at once struck by the profusion of copper objects. While no one has as yet counted the multitudinous objects in the Field Museum collection, it is estimated that there are about two thousand one hundred copper ear-ornaments or busks in storage. Taking into consideration the many perfect objects on exhibition, the masses of copper fused together, and the fragments, it seems probable that there were in the neighborhood of five thousand copper objects in the twenty-eight mounds of the Hopewell group. This, further, does not take into account the copper removed by Squier and Davis. The objects include not only those common in Ohio Valley mounds, such as celts, small plates, and ear-ornaments, but there are also copper plates, axes of unusual size, and many designs cleverly wrought from sheet copper. Nothing like these geometric figures of thin copper had been previously found in Ohio, except a few specimens from the Turner group, near Cincinnati. The whole series included such abnormal forms, so different from those found in other mound explorations, that some of our most eminent archæologists stated that it was impossible for Indians working with stone tools to have produced such delicate and finished work. It was not until the publication of a detailed report upon analysis of mound copper by CLARENCE B. MOORE,¹ that it was established beyond doubt that the Hopewell copper was prehistoric. Moore has set forth the fact that Europeans traded copper ornaments to the Indians, but that these were usually made of an alloy, and that the metal was not nearly as pure as that obtained by the Indians from the drift or mines in Wisconsin and Michigan. Additional evidence of the aboriginal origin of these objects is furnished by the presence of many fragments and

¹*American Anthropologist*, Vol. V, 1903, p. 27.

partly worked nuggets of copper, which certainly would not have been given to the Indians by traders or travellers. To present a technical study of this wealth of copper would require a special monograph, but it is not my purpose to consider in detail everything found in the mounds.

The axes and adzes found range in size from very small examples, 4 or 5 cm long and 3 cm wide to the very large example shown in Plate LIII, which weighs 38½ pounds. A distinction must be drawn between the adzes, which are concave on one side and convex on the other, with flaring edges (Plate LI), and the axes, whose edges do not flare (Plate LII).

It is well to compare these copper implements with the stone implements of the ungrooved axe class. The same types have been found, in stone, in village sites and graves in Ohio, Kentucky, and Tennessee. Most of the better stone axes and adzes have one side flat with the other convex and an edge which is often sharply beveled or curved. The makers of the copper implements probably patterned the adzes after the specialized stone adze-blades, and the ordinary axes after the stone ungrooved axe or celt. Fig. 13a, drawn by C. C. Willoughby, shows the outlines of copper adzes and axes found in the Hopewell mounds. The copper adzes and axes seem to be particularly corroded. Traces of the cloth were still visible on some specimens, and of what was apparently fur on others. Willoughby thinks that most of the hatchets, adzes, and celts had not been used. The suggestion naturally follows that these objects, notwithstanding their form, were treasured valuables rather than tools for every-day use. In Fig. 13b Willoughby has drawn three specimens found with skeleton 176. The upper ends of the two at the left are battered, and all show laminations, indicating that at least some of these objects were used as tools. It is rather

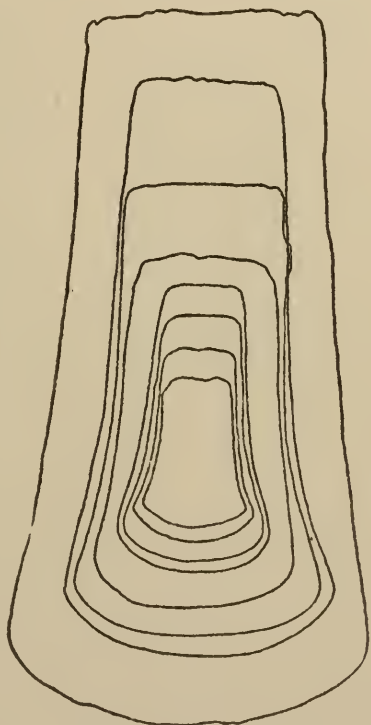


FIG. 13a.
Outline of Copper
Hatchets and Adzes.

curious that the skeleton with which these were found is that of a child.

The larger copper tool shown in Plate LIII is one of the most interesting of the Hopewell finds. The circumstances attending its discovery have been mentioned above. On it lay portions of textiles and traces of wood or bark. It seems impossible that such an object could have been put to any use. There seems to be no special differences between the copper tools found with skeletons and those from the copper

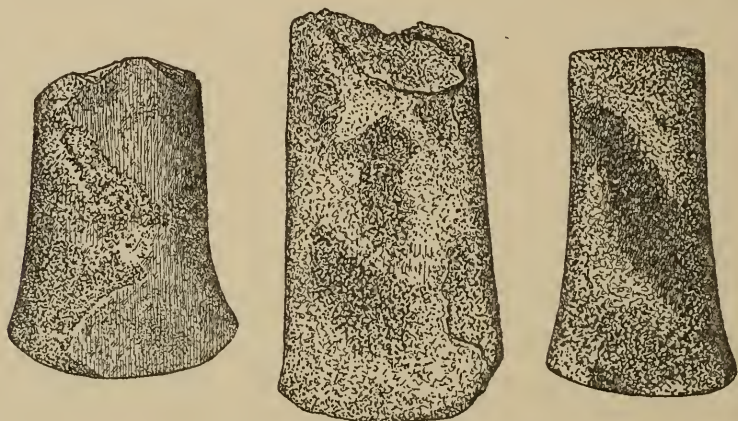


FIG. 13b.
Three Copper Hatchets from Skeleton 176.

deposits. As a general rule, the former show more signs of use. Some of the copper is very much oxidized or disintegrated. This is illustrated in Plate LIV, No. 1, which shows one of the copper hatchets nearly full size. The copper accompanying skeletons Nos. 260 and 261 was more disintegrated than that from other burials, although it is difficult to determine the cause thereof. A few small, pointed copper tools were found, but scarcely enough to constitute credit by themselves. Fig. 14 shows an awl or pointed tool of copper 17.5 cm long, found



FIG. 14.
Copper Awl or Pointed Tool from Mound 25.

in Mound 25. There was also a somewhat heavier pointed tool, which was almost pick-shaped. Someone has cleaned and polished half of it, removing the oxidization. Students of prehistoric copper artifacts have been unable to understand why the Hopewell people did not make use

of the awl and needle forms common in Wisconsin and Michigan, when they possessed so many axes, plates, and designs in sheet copper. It has been the experience of both C. B. Moore and Professor Mills that the mound copper of the Ohio Valley and the South is confined exclusively to ornaments, plates, and axes. The utility tools, such as awls, needles, and gouges, do not seem to have passed beyond the confines of Michigan and Wisconsin.

Next to axes and adzes, plates were the most numerous of the larger pieces. At least fifty more or less perfect examples were obtained, and counting the many fragments, it seems probable that over a hundred were originally placed with the various burials and deposits. The largest plate was about 24 cm long and 14 cm wide, while the smallest observed was 12 cm long and 6.5 cm wide. I should judge the average size to be about 15 by 10 cm. The plates were not quite as thin as the sheet copper designs, but varied considerably in thickness, the heaviest being about 3 mm thick and the thinnest about 1.5 mm.

One would like very much to know why the heavy axes and adzes over skeletons 260 and 261, and the thick copper plates and eagle effigies, were often badly oxidized, while the thin sheet-copper designs of the other deposits were (for the most part) well preserved. The surfaces of numbers of the copper tools are much pitted, whereas many of the thin sheets retain nearly their original form. One would naturally suppose that the frail geometric designs would disintegrate more rapidly. Possibly the quantity of bark surrounding them and the absence of contact with human remains aided in their preservation. Willoughby suggests that the thin sheets were of purer copper and more highly finished, which made them less liable to decay.

A plate of typical form, found with one of the skeletons, is shown in Plate LV, No. 1. Willoughby has drawn outlines of some of the plates illustrating variations in sizes (Fig. 15). The central plate *e* was found with skeleton 199. Plate LV, No. 2, shows a more specialized form of plate found in the sheet-copper deposits. It is a rather narrow rectangle, with three small holes drilled at either end. While classed with the plates, it is somewhat different and much thinner and, as stated, lay with the deposit of copper designs. On many of the plates there were traces of cloth, and on others slight indications of fur or hair, as though they had been wrapped in skins. Most of the plates were perforated, and appeared to have been worn on the person. On one side of the smallest copper plate found, which was with skeleton 199, there were remains of a fringe made of twisted fibre of some kind. Sinews, running from one hole to another, showed the method of attach-

ing this plate to the cloth. When found with skeletons, the plates were usually on the breast or abdomen. It is very easy to distinguish the copper plates from the designs and other material. There is, however, such a quantity of copper worked in unusual form that much of the collection is difficult to classify.

Small copper beads were found with several skeletons, also a few large beads. A few objects, probably very large beads, were found in the altars, although, as they had lain directly in the hottest part of the fire, it was impossible to determine whether they had been beads or

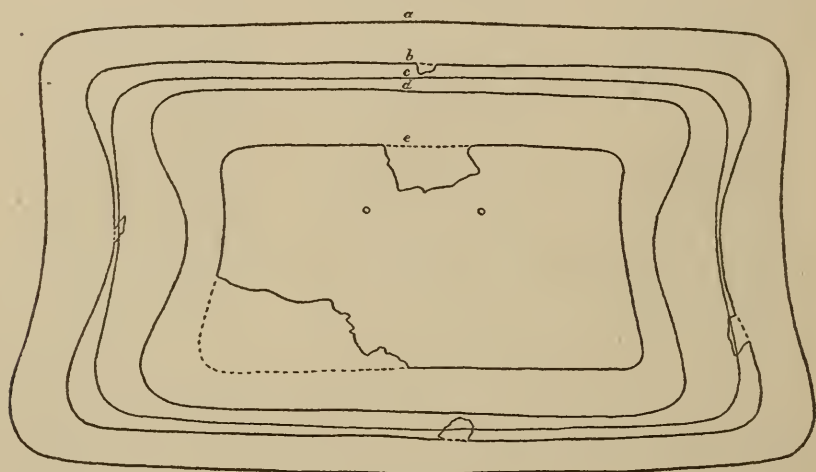


FIG. 15.
Outlines of Plates.

small cylinders. They were 3-4 cm long and 2-3 cm in diameter. I believe that they were made by rolling small copper sheets, 2-3 mm in thickness, together, and overlapping and hammering down the edges.

Many buttons and cones were found in the altars and with certain skeletons. They were shaped like European buttons, and were 12-20 mm in diameter and 5-10 mm thick. The largest examples, which have been classed as cones, were sometimes as much as 5 cm in diameter, and 2-3 cm high. Some of these objects were of copper; others, of wood or clay, were covered with silver or copper. In these the metal plating was thin, and appeared to have simply been hammered in place upon the non-metallic base. A number of these buttons and cones are shown in Fig. 16. The two largest (*a* and *b*) are about 5 cm in diameter and are covered with silver; *c* and *d* show two of the small buttons with the convex side up; and *e* and *f*, the reverse of the same specimens.

In *e* a small piece of carbonized twine still protrudes from the upper perforation. About two hundred of these buttons and cones were found, one or two of which were of meteoric iron. Plate LVI, Nos. 1-6, shows two disks of thin copper, two quadrangular, and two spoon-shaped, copper objects. There were originally handles to the two spoon-like specimens, but these have been broken off. The copper disks, if found under other conditions, would probably be considered European, as they are of the same form as a modern washer. The two quadrangular perforated objects have two minute perforations in the smaller end, as if intended for suspension.



FIG. 16.
Buttons of Clay and Wood Covered with Copper.

Spool-shaped ear-ornaments of copper are common in the Ohio mounds, and I have estimated that there must have been originally four thousand of these objects deposited in the Hopewell group. The greater number of these were of the simple type shown in Plate LVI, Nos. 7-10. Squier and Davis do not report the position of the copper spools found by them in relation to skeletons. Putnam was the first to identify them as ear-ornaments, as he found many of them in pairs, one on either side of the skull. They have also been found upon the hands or wrists. The diameter of these ornaments varies from about 3 to 6 cm with 4 cm as an average. A few specimens were covered with silver or meteoric iron, but these were quite rare. One or two of this sort were reported by Putnam from the Turner group.

The late Frank Hamilton Cushing experimented with reference to the manufacture of these objects, but students of archæology are especially indebted to Willoughby for his additional and more complete observations. With suitable stones and one or two bones of firm texture, obtained on the sea-shore, he fashioned an ear-ornament equal to those produced by the Hopewell people. The copper used was a free nugget, which he secured from a copper mine. He took as a pattern one

of the finest ornaments from the Hopewell mounds. In fact he selected one on which there was a symbolic design. In the paper detailing at length his experiment he records that, as the nugget was hammered, the outer edge of the sheet became hard and brittle, and showed a liability to crack and break. The cracks usually extended toward the centre. He therefore placed the copper on a fire made of drift wood and, after heating the metal, allowed it to slightly cool, then continued the hammering. By repeating this process he was able to reduce the copper to proper thinness. After the sheet of copper had been prepared, he pointed a stone and drew a circle of the required diameter. With the aid of his bone implement he made a groove around this circle, producing a corresponding ridge on the opposite side. He ground this ridge away with a flat rubbing-stone, and had a flat circular disk of nearly uniform thickness. Believing that the Indians had a model of either wood or clay over which they pressed the thin sheet copper, he constructed a form from pine-wood with the aid of stone implements and fire. He carved the circle with its radiating arms (which was on the original Hopewell ornament) upon the form with a stone knife. He bent the metal over the form and forced it into the grooves with his narrow bone tool and a small water-worn pebble which he used as a hand hammer. He found it necessary to anneal the copper, as the bone implement tended to harden or temper the metal. He finished the edges of the disks by rubbing them upon a flat stone, and then polished the object. He concluded that a number of plates could be thus fashioned over the same mould or form. He states that sheet copper can be readily drilled with a pointed stone, provided the point is not too sharp. He made a careful study of the construction of these ornaments, and his drawings illustrating the various steps in the manufacture are reproduced in Fig. 17. He may well be satisfied with the results of his labor, as the ear-busk made by him is very much like the one in Plate LVII, No. 1, of the Hopewell collection, although it is, of course, brighter and fresher.

Thirty to thirty-five copper anklets, bracelets, and disks were found with skeletons 260 and 261 and in the other copper deposits and altars. The small washer-shaped disks have been described elsewhere. The bracelets and anklets are made both from solid copper and from sheet copper rolled. They vary in thickness. Two are shown in Plate LVIII,—one solid, the other of sheet copper, edges turned over. The largest one is 9.5 cm in diameter. In the one made of sheet copper it will be observed that there is an opening extending entirely around. The edges are made smooth, so the bracelet could be worn conveniently.

Plates LIX A and B show several more of the ordinary single (solid) wire bracelets and the rolled sheet ones. There is great diversity in the manufacture of the anklets or bracelets. The thickness of the strip varies, and in some of the hollow ones a solid bracelet was found inside.

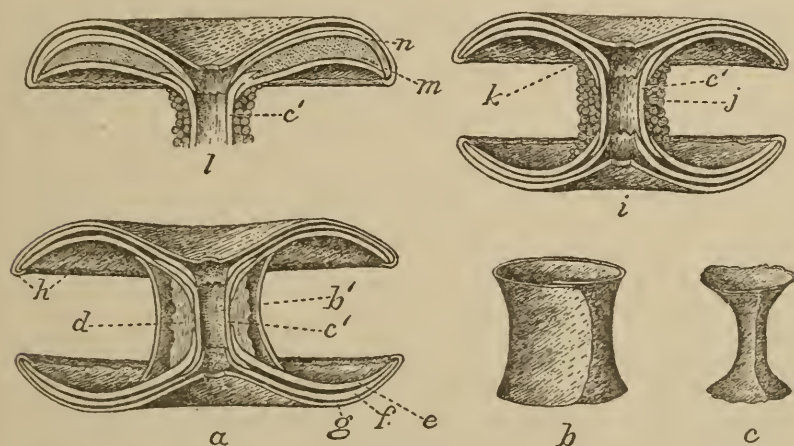


FIG. 17.
Construction of Ear-Ornaments.

Copper bracelets have been found in many mounds with skeletons, but the disks, six of which are shown in Plate LX, are most unusual. A photograph does not bring them out clearly. They are saucer-shaped. If one took an ordinary saucer and cut out the bottom, leaving the rim concave within and convex without, one would have an exact duplication of these objects. All of them are very nearly true circles. They were found fitted one within the other. It has been suggested that the form was probably produced by placing a thin sheet of copper over a rounded wooden object or stone ball, and the copper was thus hammered into shape. It would be easier to cut out the hole first, while the copper was flat. They are smoothly finished. These objects are of the same form as the large silver disks worn by Navajo Indians at the present time on their belts.

The majority of these objects were found in a single deposit about 25 feet from the first altar discovered and 15 feet below the surface. They were laid horizontally, occupying a space approximately 3 by 2 feet, and were protected above and below by layers of bark. The objects found in this deposit, 118 in all, were the most remarkable found in the Hopewell group. In fact, their counterpart had not previously been reported. Studies of them made by Putnam and Wil-

loughby lead observers to believe that most of them are cosmic symbols. They show great variation in form, ranging from small objects with an elevated circular centre and expanding wings (Plate LXI, Nos. 1-4) to the large complicated designs shown in Plate LXVIII, No. 4.

In Plate LXI, Nos. 5-7, are shown three prong-like objects, made of very thin copper, which were 25 cm long. The base of the most perfect one shows a perforation. In Plate LXI, Nos. 8-9, are illustrated two other objects whose form suggests that of Nos. 5-7, although with marked differences. The figures of Plates LXII and LXIII suggest the head of a serpent. Those in Plate LXIII are not unlike the oval and wing walls or "plumes" lying at the head of the Serpent Mound in Adams County, Ohio. Plate LXIV illustrates three similar objects, much corroded. Plate LXVIII, No. 4, is probably the best and most interesting of all the stencils. It evidently represents the head of a serpent. The two perforated disks a little back from the pointed end probably represent the eyes. The object has been mended in two places, but the repairs do not come out well in the photograph. Willoughby in his article published in the Holmes Memorial Volume, suggests the placing of the forked objects (Plate LXI, Nos. 5-7) above this head, representing the forked tongue or fangs. In Plate LXV, Nos. 1-2, are shown two designs of unknown significance, cut from very thin metal and beautifully made. We will assume that in the design of No. 1 the maker first cut out the three oval perforations. This left the three projections, and small circles were then cut in the centre of these. Thus the symbol "three" occurs three times, although I am unable to say whether this has any significance. In the other design there are four arms, each of which is turned at the end, leaving a small opening. Between these arms there are four leaf-like projections each of which is perforated with a circle. At the base of each of these projections there is a small perforation which probably served for the attachment of the object. Thus the symbol "four" occurs four times.

One of the large stencils which seems to have been divided into four parts is shown in Plate LXV, No. 3. The proportions of the different parts are nearly perfect. All around the margin of this object are small perforations, probably for attachment. Plate LXVI, Nos. 1-2, must be classed as one of the designs of unknown significance. It seems probable that they are the halves of large double ornaments. In Plate LXVII, Nos. 1-2, are shown two swastikas. A number of these, large and small, were found. In Plate LXVI, Nos. 3-4, are represented thin, toothed strips of copper, very naturally called saws. They are too small and thin to have been used as tools, however. They

may have been intended to portray lightning. There were a number of objects of the sort which are shown in Plate LXVII, Nos. 3-4. They are diamond-shaped, containing four perforated ovals. In the top and bottom ovals the perforation is round; in those at the sides, oval. This is particularly mentioned, because it affords evidence that the artistic proportions were usually preserved by this people. This is true of their bone carvings, as well as of their copper work. In Plate LXVIII, Nos. 1-3, are figured designs evidently cut with the aid of patterns. The central cosmic symbol is not uncommon in Mexico and Asia, and has been variously interpreted. PUTNAM and WILLOUGHBY¹ have compared these designs with the serpent designs found on the Cincinnati tablet and with similar designs from the Turner and Hopewell groups. They have made a study of these symbols and published an abstract of their observations.

An object which apparently represents the claws of a bear is shown in Plate LXIX, No. 1. Several specimens of this sort were found with the sheet-copper deposit. Apparently they were made by hammering sheet copper over narrow convex wooden forms. On two of them the lamination is visible. In one specimen, a claw which had been broken off is mended with a piece of copper fastened underneath and attached with small rivets. It is possible that these objects were used as combs. Combs of bone have been found in Iroquois sites and at Madisonville, but I am unable to state whether any of these were of this form. In Plate LXIX, No. 2, is shown a fish effigy, four of which were found in the deposit. These were not all of the same size, and there are variations in the length of the body and the shape of the mouth and fins. The gills, and the juncture of the fins with the body, are shown by curved lines. There are two small perforations above and below the eye, and another pair at the base of the dorsal fin. The tubercles at the mouth are shown by repoussé work. These effigies appear to represent the large sucker, locally known as the "red horse," which is common in the Scioto River. I do not know why this fish should have been selected, as one would think the Indians would have preferred the bass, catfish, or even the perch, for these designs. It is possible that the effigies represent the buffalo fish instead of the "red horse" or common sucker.

Two slender slightly hollowed copper objects are shown in Plate LXX, Nos. 1-2. They have two small perforations at the wide concave end. But for these perforations they might be considered utensils of some sort; but as it is, they must be placed in the unknown class.

¹Symbolism in Ancient American Art, *Proceedings of the American Association for the Advancement of Science*, Vol. XLIV, 1896.

Plate LXX, No. 5, is almost hatchet-like in form. At first it suggests the spatulate forms in slate and granite found in Wisconsin and Tennessee, but it clearly shows three small perforations which indicate that it was fastened flat to some surface. It seems to me, in studying these problematical forms of sheet copper, that the perforations are of primary importance. Nearly all of them contain these minute holes for rivets or pins, which would seem to indicate that they were either fastened to wooden bases or upon garments. In No. 5 we have a broken object of

the same form as Fig. 18. No. 3 on Plate LXX is a small copper oval with two perforations. No. 4 on the same Plate is an imitation bear's tooth in copper.

A number of copper head-dresses were found, all but two of which were in fragmentary condition. The antlers (described above) found at the head of skeleton 248 are shown in Plate XLIX. It is well in this connection to reproduce some designs from bone and stone, as well as copper. Fig. 19b is taken from the Cincinnati tablet, *a* from a sheet-copper design of the Hopewell group. These two designs, found about 90 miles apart in mounds surrounded by earthworks, suggest the earthwork symbol. In some Hopewell designs we have the circle or symbolic eye in the centre surrounded by the square earthwork.

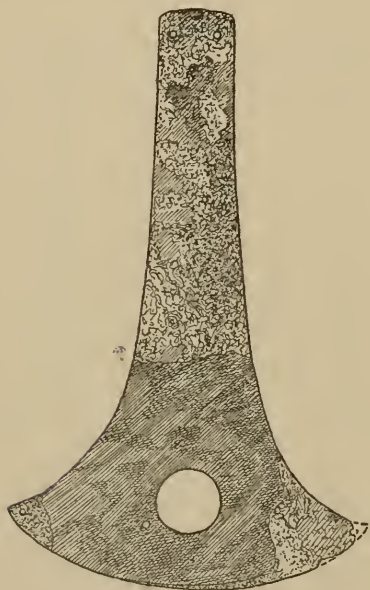


FIG. 18.
Problematical Form in
Sheet Copper.

Willoughby says of this, "The indentations or spaces in the human serpent head of the Cincinnati tablet are represented in the copper design by the seven notches above and below, as shown in the illustration."

Figs. 20 and 21 show how the copper head-dress was worn. In the former Willoughby's drawing taken from one of the bone objects found with a skeleton in Mound 25 is reproduced. In the latter he has taken the design apart in order that it may be conveniently studied. Plate LXXI shows a head-dress, or rather a curved cap or helmet of copper which was found at the head of skeleton 243. It is fragmentary, but was probably 16 cm long and 10.5 cm wide. It has short horns, and

may represent the head of the deer after the horns have been shed. The projections are not unlike certain stone objects which have been found in the Ohio Valley.¹ With reference to this specimen, Willoughby states, "The copper portion of this head-dress is made in one piece. The copper projections surrounding the wooden cores have crumbled off at about one half their height. The broken tops of the copper at that place show it to have been made of thin pieces of metal hammered together. The head-dress is so corroded that it is impossible to work out the process with exactitude. No mark of junction with the main

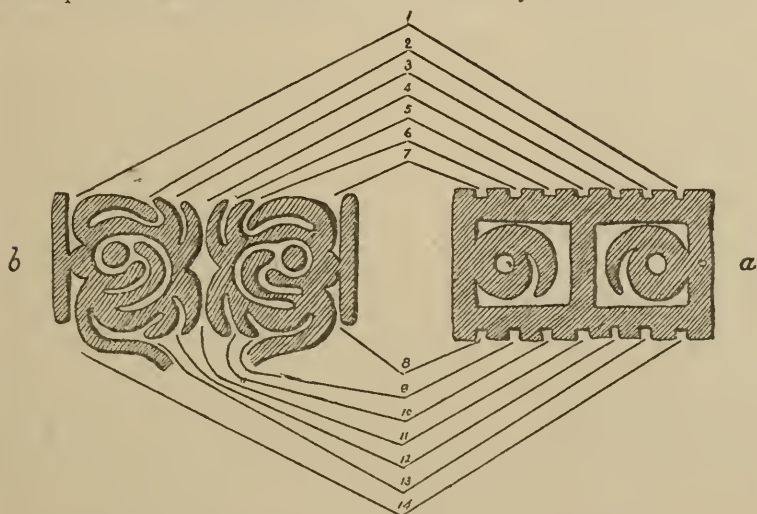


FIG. 19b.
Design from the Cincinnati Tablet.

FIG. 19a.
Design from a Sheet Copper
of the Hopewell Group.

plate shows on account of corrosion. The wooden cores have been almost perfectly preserved by the salts of copper. They were very carefully made, and probably served as forms over which to mould the copper. Judging from the preservation of their tops, it is quite evident that the copper still covered them when the mound was opened, and crumbled when the earth was removed. The plate is nearly straight across the forehead and round at the base."

Several sheet-copper effigies, apparently representing eagles, were found. One of these is shown in Plate LXIX, No. 3. They range from 26 to 35 cm in length, being about 5 mm thick and somewhat thicker than the sheet-copper designs. Most of the specimens were fragmentary, but one or two have been restored. In some cases the entire body

¹Cf. *Stone Ornaments in Use among the American Indians*, pp. 104, 106, 390.

of the bird does not seem to have been shown. The head is exaggerated, the wings are indicated above the back rather than at the sides, and the tail is spread. These effigies may have been carried on a staff or placed

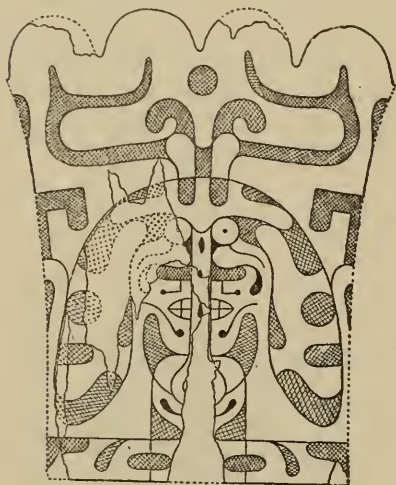


FIG. 20.
Bone Object from a Skeleton in Mound 25,
Showing a Figure with Copper Head-dress.

on the corners of the ceremonial lodge, as were the eagle effigies which Tonty saw on the corners of buildings in the lower Mississippi Valley. Two wooden bear's teeth plated with copper were found with skeleton 177. They had apparently been worn as ear-pendants. They were badly broken, but the wood seemed to have been maple. The plating was neatly done, and the seams where the sides joined were carefully rubbed down, and the whole surface made smooth and even. There were several copper cylinders, one of which is shown in Fig. 22. These originally covered bone tubes. They were badly decayed, and all but the one shown were in fragments. Usually they appear to be a union of three cylinders. Similar copper cylinders have been found by other explorers in the mounds.

Plates LXXII—LXXIII show fragments of pure copper, hammered and unhammered, and also copper fused by the heat of the altars. Fully thirty copper nuggets of all sizes were found, these having undoubtedly been brought from the Lake Superior region. Most of them were found in altars, but a few were with the deposit covering skeletons 260 and 261. Before describing these objects, it is well to offer some suggestions as to the source of the material. Meteoric iron was found by Putnam

in the mounds of the Turner and Liberty groups, and a few specimens have also been discovered by Mills. I found a small ear-ornament of this material in the Porter Mound in Frankfort, Ohio, and it is probable

of the bird does not seem to have been shown. The head is exaggerated, the wings are indicated above the back rather than at the sides, and the tail is spread. These effigies may have been carried on a staff or placed

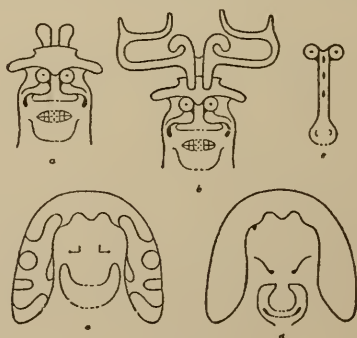


FIG. 21.
Same Object as Fig. 20,
the Design being Taken Apart.

that the oxidized iron objects mentioned by early writers upon Ohio archaeology were of meteoric iron. All this would indicate that there was some considerable supply of this metal. Inquiry seems to indicate that few fragments of meteoric iron were discovered in southern Ohio in recent years. Indeed, one might venture the assertion that there was more meteoric iron in the Hopewell group alone than in all these recent finds. This seems to be more or less significant. Either the fall of meteorites was more frequent, or the Hopewell people had access to some good-sized meteoric iron deposit the location of which is at present unknown. Meteoric iron is malleable, but not so easily worked as copper. The natives must have reduced it to the desired form by hammering and grinding. There are in the Hopewell collection thirty or forty fragments of meteors and iron artifacts. These include fragments of plates, hatchets, cones, beads, and small chisel-like objects about 10 cm in length. While searching the ashes and debris from Altar 1, Willoughby found a shell bead in the perforation of which was a slender meteoric iron drill, broken, but identifiable. Nearly a hundred iron beads were found in the two altars, but most of them were damaged, and it was impossible to count accurately.

Fig. 23 shows Willoughby's drawings of four of the meteoric iron objects. Three of these are evidently cutting tools inserted in stag-horn handles; *a* indicates that the chisel-like blade was curved, but it is badly corroded. In *b* the handle is better preserved, the inner end of the shank being rounded. The back is nearly flat. In *c* the iron blade is well preserved, and the edge is still sharp enough to cut soft wood. The upper part of the handle has been almost entirely burned away. Plate LXXIV shows five fragments of meteoric iron, which do not seem to have been worked.

Lumps of galena were found in a number of the mounds, and a few pieces were picked up on the surface in the group. Little or no surface galena is found in the State of Ohio, and geologists have stated that it probably came from farther west, possibly Illinois or Missouri. The Indians seem to have regarded it as valuable and, placed large lumps

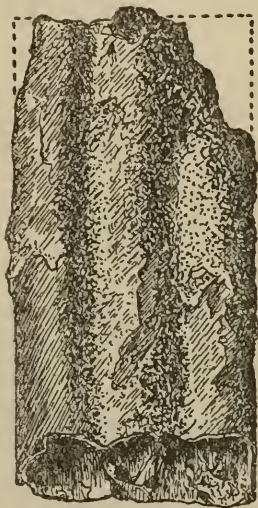


FIG. 22.
Copper Cylinder.

in the mounds, without attempting to either work it or melt it into lead.

CHIPPED STONE; OBJECTS OF QUARTZ, CRYSTAL, AND OBSIDIAN.—Numbers of small unworked quartz crystals, which were practically perfect, were found in the altars, but the objects made of this material



FIG. 23.
Meteoric Iron Adze Blades in Antler Handles from Altar 1.

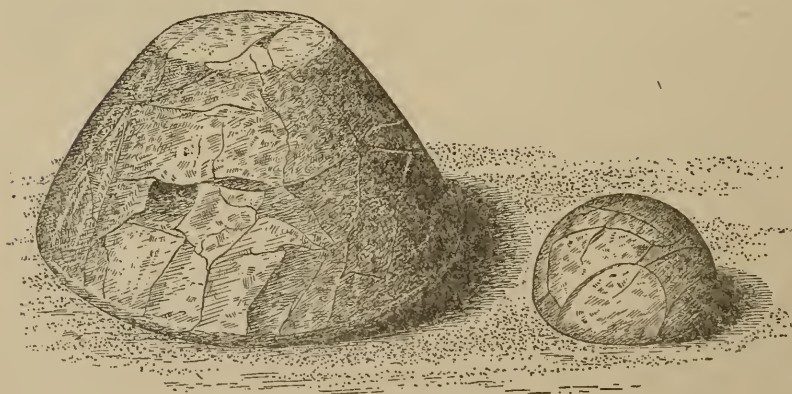


FIG. 24.
Cones of Quartz Crystal.

seem to have suffered more from the heat of the altar fires than those of any other class. Nearly a bushel of fragments were obtained, but it is impossible to restore most of the objects. There were large numbers of very fine knives and spear-heads, some of which were 9-11 cm in

length. As there is considerable waste in the manufacture of an implement, a crystal of large size must have been required. No quartz of this size occurs in the Ohio Valley, except perhaps in upper Tennessee or Cumberland, where crystals may occur large enough for the manufacture of points 8 or 9 cm long. The Hopewell people must have either known of deposits of crystal now exhausted, or have obtained them by trade from some Indians, who lived in mountainous regions, where large crystals occurred. Fragments of slender drill-like objects were found, also plummets and cones. One object is about 8 cm long and 1 cm in diameter. The ends have been polished, and there is a groove around one end similar to the groove at the head of a plummet. Another slender crystal has been worked into plummet form and drilled from opposite sides, the perforation being 3 mm in diameter at the openings and 2 mm wide in the centre. In regard to the cones, shown in Fig. 24, Willoughby says, "These two cones, taken from Altar 1, were cut from transparent quartz. They had been cracked into many fragments, but these were matched, and the outlines of both specimens are now perfect. Some of the cracks of the large cone are stained

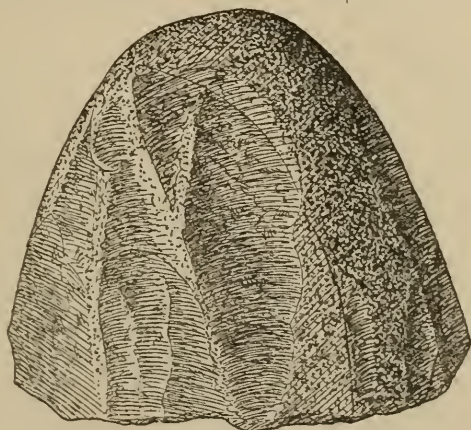


FIG. 25.
Cone of Quartz Crystal.

with green carbonate of copper, but the small one shows little staining. From the same altar was taken another quartz crystal, practically perfect (Fig. 25). It appears to have been originally a core from which quartz knives were thrown off by pressure. It has been partially ground down, and evidently was to be worked into a form similar to the others described. From Altar 1 was taken also a portion of a large crystal of brown or black tourmaline." It seems to me that the delicate work in quartz adds emphasis to the high character of Hopewell art. Crystal is much more difficult to work than either quartzite or hematite, although all these are hard and refractory materials.

An inspection of the obsidian implements from the Hopewell group now in Field Museum of Natural History indicates that there are 262 blades, knives, spear-heads, etc., together with a great number of frag-

ments. It seems probable that about five hundred implements were originally placed on the altar. After much painstaking work, C. L. Owen of Field Museum has restored a number of these knives and blades. The largest, broken by the heat of the altar, was originally 38 cm long and 14 cm wide, and they range from this down to small objects 5.5 cm long. The average dimensions of the larger implements are: Length 25 cm, width, 8-11 cm, thickness, 0.5-1 cm. Most of them are of the forms shown in Plates LXXV — LXXVI, and in Willoughby's drawings (Fig. 26). The points of several of them are

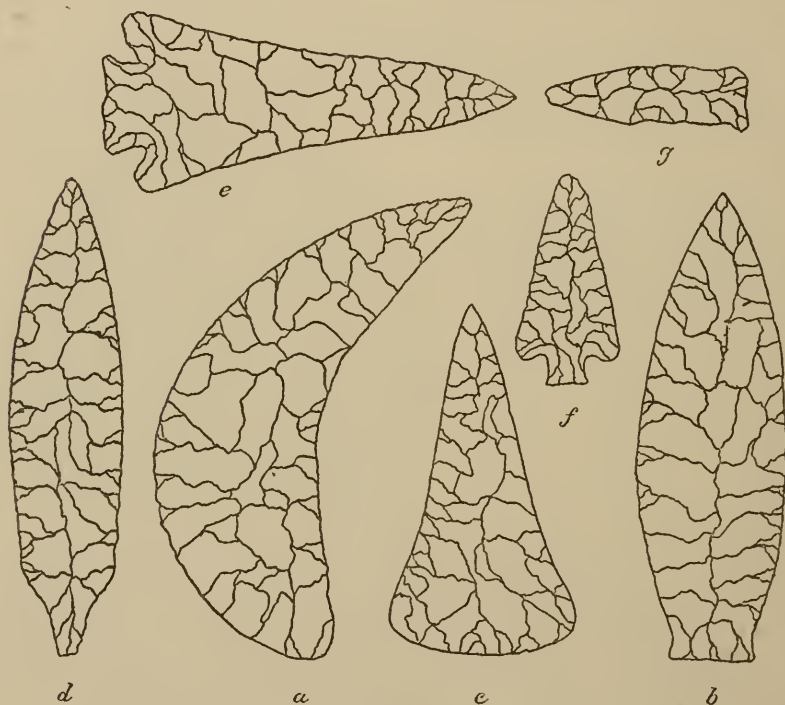


FIG. 26.
Obsidian Implements from Altar 2.

curiously curved, after the manner of knives. Almost all of them belong to three or four patterns, which are distinctively western, and do not compare with types common in the Mississippi Valley. In most of them, the notches or barbs are cut diagonally. There is a slight widening in the upper part of the stems. The bases of the unbarbed ones are often angular, coming almost to a point. In some of the more slender ones,

the bases are rounded. Some are double knives, being pointed at both ends. The work is no better than that of our best artists in flint craft in Ohio, Kentucky, or Tennessee.

Putnam informed me that the obsidian came from Yellowstone Park, not from New Mexico or California. If such was the case, it must have been brought by canoe at least three thousand miles down the Yellowstone, thence down the Missouri, up the Ohio, and up the Scioto to the Hopewell group. Viewed from our present ease and convenience of travel, this statement carries no significance to the reader. In prehistoric times it was necessary for the Indians to go on foot or in canoes to the localities where obsidian could be obtained, all of which meant a journey of several months duration. They would be compelled to pass through regions occupied by hostile tribes and to delay their journey, in order to obtain food. The objects were not made on the Hopewell site, for no chips have been found there, or anywhere in the Ohio Valley. If these objects were not obtained by means of a journey on the part of the Hopewell people, they must have come in through trade. I do not believe that they were bartered from village to village from the Yellowstone to the Scioto, else we would have found obsidian implements in mounds of Illinois, Missouri, and elsewhere. Although hundreds of tumuli have been explored, little obsidian has been found outside the State of Ohio, although a little has been found in Illinois mounds. Although great numbers of arrow-points, drills, knives, and spear-heads of obsidian are found in the Northwest, none of the small points occur in the Hopewell group. The offerings were confined to large and rare types, which were for the most part specialized forms. It is rather curious that the smaller points of carnelian, agate, etc., were not brought to the Hopewell site.

It is surprising that there were so few chipped objects of either Flint Ridge stone or Tennessee chert. Most of the chipped material from the mounds was obsidian and quartz, except the large number of disks from Mound 2, which seem to have come from the quarries on Little River, Tennessee.¹ It does not seem possible that the Indians carried the 8,185 disks overland from Tennessee to the Hopewell group. More likely, they brought them by canoes, which necessitated the following journey—down Little River to the Cumberland, thence to the Ohio River, up the Ohio to the Scioto, then up to Paint Creek to the North Fork of same, and then to the Hopewell group. This is a distance of eight hundred miles. All the flint material made use of by the Hopewell

¹These workings are described in *Bulletin of Phillips Academy*, Vol. III, pp. 126-132; also in the writer's *Stone Age of North America*, p. 218.

people could have been secured from Flint Ridge, distant less than one hundred miles from this place. The chalcedony of Flint Ridge is superior to the Tennessee chert. Why, then, should the Hopewell people have brought a large mass of material so great a distance? Was it because they were in closer touch with southern people than with northern? Or were the Flint Ridge quarries in the territory of a hostile tribe? These questions may have a bearing on the migration or origin of the Hopewell people.

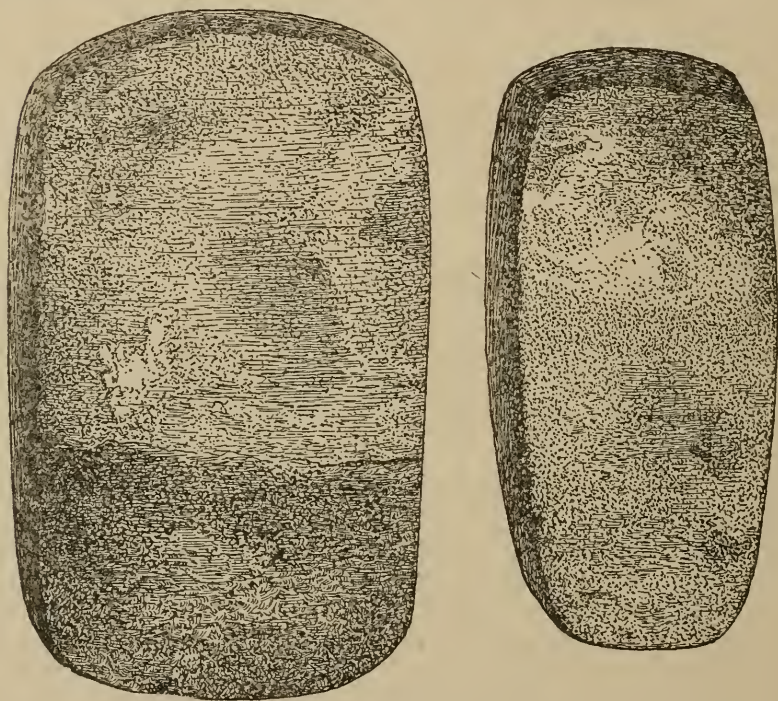


FIG. 27.

Two Sandstone Tablets from Altar 1.

GROUND AND POLISHED STONE.—Forty-eight objects made of the same fine grained sandstone of which the Cincinnati tablet is composed were found in the group. Most of them were in Altar No. 1, but one rattlesnake tablet (Fig. 9, on p. 88) was found in Mound No. 1. Nine of these sandstone objects may be classified as tablets, but the others are almost celt-shaped, although they have not been brought to a cutting edge. The largest of the tablets is 15.5 cm long, 9 cm wide and 1.5 cm thick. The largest of the celt-shaped objects is 10 cm long and 3 cm

wide. A few of the smaller specimens of this type are sharpened at one end. Two of the largest tablets, drawn by Willoughby, are shown in Fig. 27. None of the rectangular tablets are polished, and they show no traces of carving or other decoration. Fig. 28 shows several of the

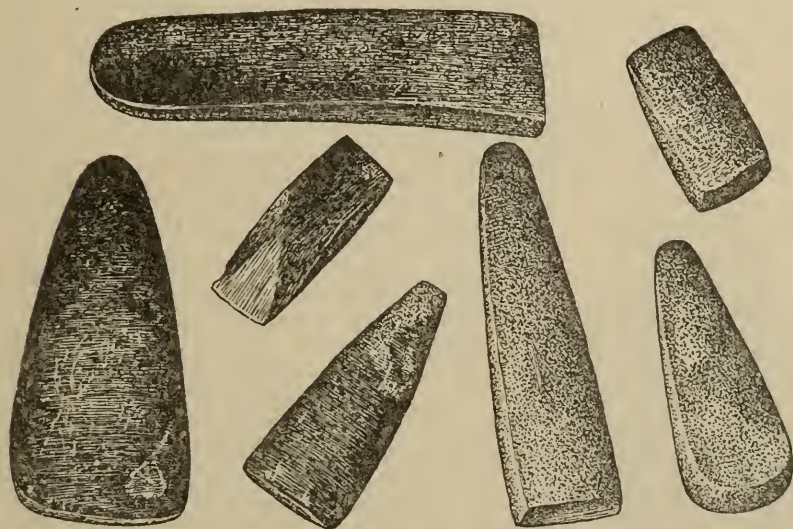


FIG. 28.

Seven Sandstone Tablets and Celt-like Objects from Altar 1.

celt-shaped objects. Those on the left appear to be of limestone instead of sandstone, and are rather highly polished. The use to which these objects was put, is of course, problematical. In their present state the larger ones appear unfinished, and it is possible that they would have eventually been decorated or carved. A number of plummets, which do not differ from those found in the village sites of the Ohio Valley, were found in Altar 1. Squier and Davis also found numbers of these in their explorations. As a rule, these objects are rather long and slender, well polished and symmetrical (Fig. 29).

The objects commonly known as "problematical forms," that is, banner stones, boat stones, bird stones, etc., are almost absent in the Hopewell group. We did find one or two slate ornaments and gorgets, but none of the pendant or crescent forms were found, and no stone tubes. Fig. 33 has the general form of the short bar-amulets from the Ohio Valley, but differs from them in that it has a groove across the back and notches on the ends. The ordinary bar-amulet is also longer

and more slender. The material is probably cave gypsum. Fig. 31 shows a problematical form from Altar 2. It is 7.25 cm long and 4.5 cm wide, with a perforation of 14 mm in diameter. Similar objects occur in Kentucky and Tennessee, and are occasionally found in Ohio and Indiana, but are usually from ancient village sites, not from mounds. Fig. 32 represents a small bowl-like affair that can scarcely be classed as a boat stone. It has been badly damaged by the heat of the altar

fire. Fig. 34 is the nearest approach to a bird stone from the Hopewell group. It is 7 cm across the base and 5.5 cm high. The material is mottled granite. It has the protruding ears characteristic of the short-winged bird stones of northern Ohio, western New York, and southwest Wisconsin. There are perforations on either side of the base in the same position as on ordinary bird stones. It may possibly portray an owl. It is interesting to note that, so far as I am aware, the plain bird or saddle stone has not been found in the Ohio mounds. Fig. 30 illustrates a highly polished, hollow object of slate which was found in Altar 2. It suggests a growing horn. It is clearly a problematical form, and might be classed as a boat stone but for the fact that the lower part is almost pointed. A stone ornament shaped like a bear's tooth (Cat. No. 56551) is shown in Fig. 35.



FIG. 29.
Hematite Plummet
from Altar 2.

If the builders of the Hopewell group made use of ornamental problematical forms in shell, slate, and other materials, it is to be supposed that they would have placed them with burials or in altars. C. B. Moore has found them with burials in Kentucky, and Mills discovered them at the Tremper mound, which is of Hopewell culture. It is curious therefore that they should not have occurred at Hopewell, where the culture seems to have reached its highest artistic development. It is not advisable to enter here into a lengthy discussion of this problem, but the subject seems to be of considerable importance, as the problematical forms apparently represent a special development of art in stone.

Fig. 36 shows a curious effigy, probably of serpentine. It has been

much discolored by exposure to the altar fire. It is difficult to determine the creature represented, but one observer suggests that a tadpole is intended. The lower part, or base, is hollowed out as in a boat stone. There are four perforations ranging from 4 to 6 mm in diameter. Half

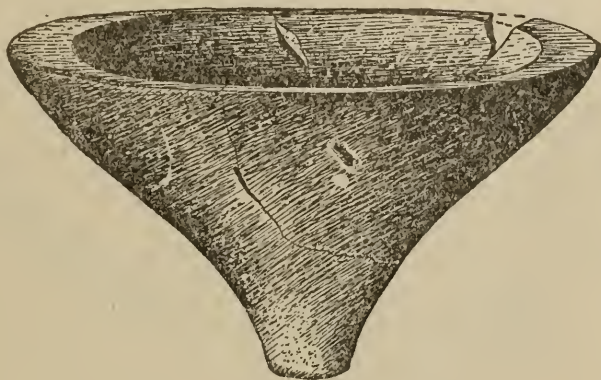


FIG. 30.
Worked Object of Slate from Altar 2.

of a pearl bead was found in one of the eye cavities. Fig. 37 shows one of the most carefully executed carvings from the Hopewell mound. It is made from dark green serpentine, and is highly polished. The body is hollow, and is ornamented with six longitudinal grooves. There are eight perforations. In one of these a close fitting, neatly made plug of serpentine had been inserted. C. C. Willoughby describes this object as follows:—

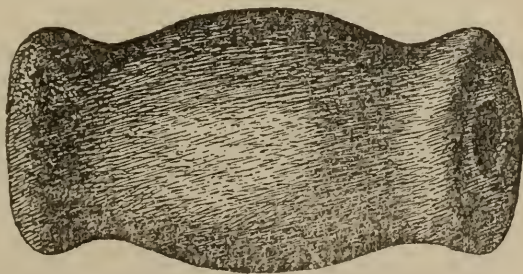


FIG. 31.
Problematical Form in Stone from Altar 2.

“It seems probable that the carving (Fig. 37) represents an owl, somewhat conventionalized. The ear-tufts appearing over the eyes, and the curved lines which extend backwards and downwards from the

eyes marking the outer border of the ruff, seem to indicate this bird. The surfaces of the eye cavities are unpolished. Through the centre of each eye-depression is a small perforation opening into the hollow of the head. Pearls may have been inserted to represent eyes, being held

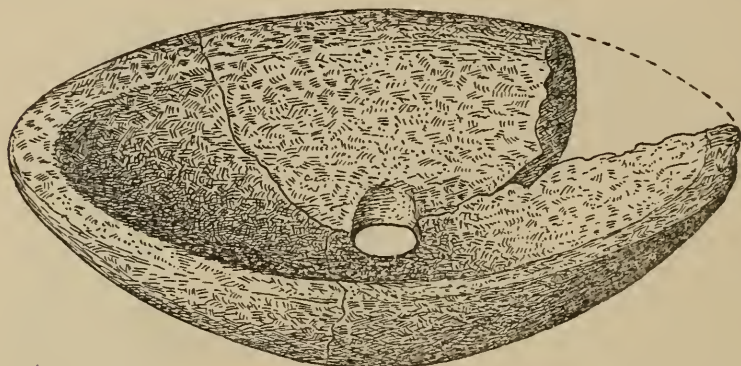


FIG. 32.
Problematical Form from Altar 1.

in place by thread fastened inside the cavity. The incised lines upon the head of the carving still contain a small quantity of the red pigment which originally filled the lines, wholly or partially. Along the back are four perforations, less than 2 mm in diameter. There are two perforations on each side, one near the front, the other near the back.

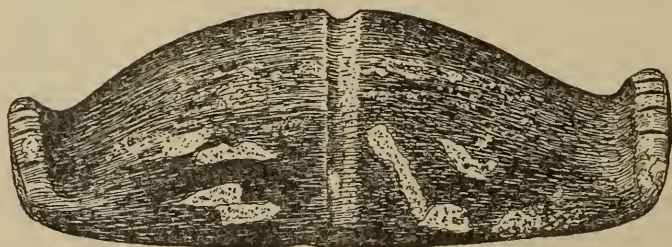


FIG. 33.
Bar Amulet of Stone from Altar 1.

This carving has been highly polished. The lines are of uniform width and depth, and evince a great deal of skill on the part of the artisan."

Fig. 38 shows the effigy of a human thumb made from cannel coal, which was found with skeleton 278. A number of other objects of this material were found in the mounds, although those placed in altars had

been almost completely destroyed. Cannel coal could have been secured at Flint Ridge, the nearest outcrop, or in West Virginia.

A remarkable series of stone rings were found in Altar 1. Fourteen complete specimens were recovered together with several scores of fragments. The largest is 6.5 cm wide and 1.75 cm thick, while the smallest is 5.5 cm wide and 1.75 cm thick. In Plate LXXVII, Nos. 1-2, are shown two of the best specimens. It will be observed that melted copper still adheres to one of them. Plate LXXVII, No. 3, illustrates the ordinary form of these rings. "These rings are made from varieties of what appears to be slate, some containing mica, one apparently from the same material as one of the pipes from Altar 2.

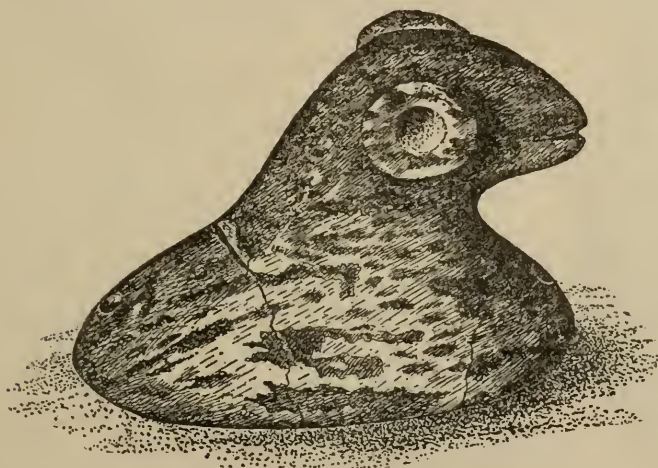


FIG. 34.
Bird Stone.

One of them is evidently made from bituminous slate, the inside polished. The exterior groove is much less finely finished than the rest of it or the other rings. This shows marks of an implement, apparently of rough stone, where the groove has been worked out. The groove shows irregular depressions, also marks of the stone tool, running lengthwise, but not parallel. This is the only specimen which shows marks of the stone tool used in forming it before polishing."

Plate LXXVII, No. 5, as described by Willoughby, shows "outlines of four rings, exhibiting symmetry of form. Some rings are not pierced; some are pierced with four, and others with eight holes, always in pairs placed opposite each other. The rings vary in size, the largest being 6 cm in diameter. In several specimens, the drilling seems to

have been done from both sides with the holes meeting in the centre. Usually the inner hole is at only a slight angle, which shows that the drill must have been small, probably made of meteoric iron. Two rings formed of a soft slate or similar substance, one of which is shown in Plate LXXVII, No. 4, possibly cannel coal, are unsymmetrical, and evidently were worked out by hand. These rings are perforated by four pairs of holes placed opposite each other."

Plate LXXVII, No. 4, shows a ring, or rather band, without flanges. It seems to be made from graphitic slate. It has four pairs of holes.

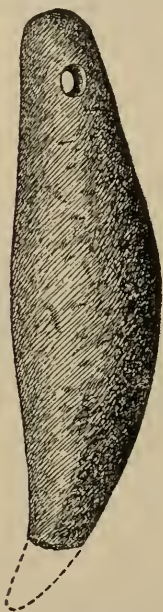


FIG. 35.
Bear's Tooth
Carved from
Stone from
Altar 2.

PIPES.—About forty pipes were taken from the Hopewell mounds, although some of these are fragmentary. The prevailing form is that of the monitor or platform pipe common in the Ohio mounds. This needs no description. An angular-shaped pipe of soapstone was, however, found in one of the ash-pits. The materials used for the monitor pipes are fine grained sandstone, graphitic slate, a marly limestone, or a hard clay stone. One or two specimens were made from a stone quite similar to catlinite. Mills¹ calls this material Ohio pipestone, and gives an analysis. The color of some of the pipes had been changed to a deep brownish black by smoking. Four nearly identical pipes were found in Mound 25. They vary in length between 10 and 11 cm and in width between 4 and 5 cm. The bowls are 3-3.5 cm high.

Plate LXXVIII, No. 1, shows a very fine pipe of hard black stone. A series of small holes encircle the bowl a short distance below the rim; 4 mm below these is a corresponding series of small projections. On the body of the pipe conventionalized roseate spoon-bill heads are carved in pairs. The finest pipe in the entire collection is shown in Plate LXXVIII, No. 2. It was found in Altar 2. Although the technique of this pipe is not quite equal to that of some others, it ranks as one of the best examples of aboriginal carving from the mounds of the Mississippi basin. The two effigies have been carved from a solid piece of fire clay, and great skill was necessary to preserve the proportions and to carve out the narrow space between the end of the bill and the head of the

¹Certain Mounds and Village Sites in Ohio, Vol. I, p. 132 (Columbus, 1917).

fish. The bowl extends through the back and body of the bird and into the fish. The stem hole, about 5 mm in diameter, runs through the mouth and body of the fish. Undoubtedly pearls were inserted in the eye-cavities of both figures, but these were not found in position.

The bird represented is probably the roseate spoon-bill. The neck is disproportionately short, and the legs and feet are not shown. The

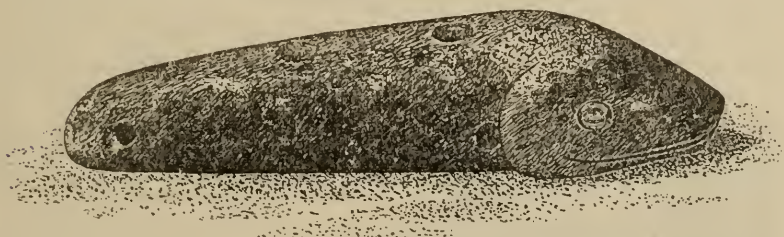


FIG. 36.
Stone Effigy of Tadpole (?).

feathers of the wings and tail are indicated. The bill is carefully executed. The line extending from the nostril to the hooked end of the beak, which is characteristic of the spoon-bill, is faithfully shown. The fish is conventionalized, and its species cannot be determined. The scales are not indicated, and possibly the artists had in mind the channel catfish, common in the Scioto. It may represent one of the large salamanders common in the southern Ohio streams. Willoughby's

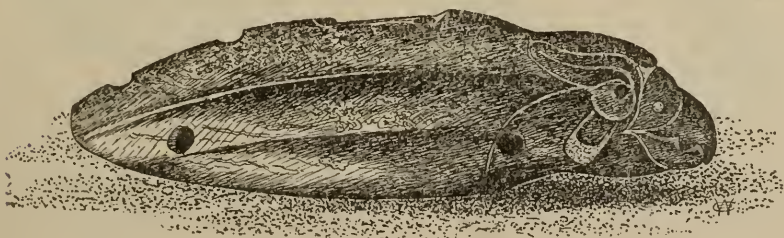


FIG. 37.
Effigy of Serpentine (Owl?).

observations on this specimen are here presented in condensed form. It was not moulded, but was evidently carved from soft clay. There are several little depressions or indentations upon it, apparently made by striking it with some implement while administering the finishing touches. The bill had been broken off and mended before the pipe was placed on the altar. The Indians had bored into the head through

the broken part of the beak, made a corresponding hole in the fragment, and doweled the two together. The pipe is dark brown, but has probably been darkened by the altar fires, as fresh surfaces show light gray or clay color. Part of the beak, where a sliver has broken off, is reddish. It is evident that the pipe had been wrapped in, or placed upon, cloth; for a few small pieces of the fabric still adhere to it.

MICA.—Mention has already been made of the great find of mica in Mound 17. There was so much of it that when packed for shipment it filled two barrels. Some of the larger masses or books were 50 cm in diameter and 1.5 cm thick. Mica of this size must have come from surface outcrops in North Carolina. The West Virginia mica blocks are smaller; and New Hampshire, the nearest other possible source, is too

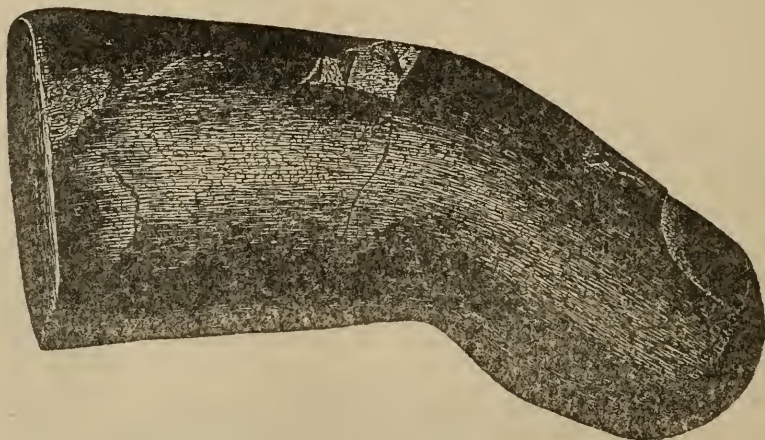


FIG. 38.

Effigy of Human Thumb Made of Cannel Coal from Skeleton 278.

far away. It was not difficult for the Indians to cut mica with flint knives. An experiment proved that squares and circles could be cut from thin sheets with comparative ease. A number of objects of cut mica, most of which were found in Altar 1, are shown in Plate LXXIX and Figs. 39 and 40. Those in Fig. 40 were probably fragments of larger designs. There were about two hundred of these designs including circles, scallops, knife forms, ovals, human heads, and unknown designs. Willoughby says that a study of these objects and of the designs in copper, as well as on shell and bone, proves that the Mound Builders of Ohio had attained a high degree of skill in free-hand drawing, and that they employed as aids guidelines, straight edges, and some form of artificial aid in drawing circles.

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FOSSILS.—Fossils were found in Altar 2 and with a few burials. Geologists who examined them tell me they are foreign to Ohio. The shark teeth, ranging in length from 20 mm to 10 cm, are probably from the phosphate beds of North and South Carolina. Three of them are shown in Fig. 41. Fig. 42 shows the most interesting fossil found, described by Willoughby as follows: "The beautiful iridescence of the fossil, before it was burned, is suggested by a portion upon one side untouched by fire. The fossil was cut across forming a flat base. On the upper side near each end is a countersunk depression, communicating with a hole about 3 mm in diameter, running downward and slightly outward towards the ends, and penetrating the fossil. Pearls were probably inserted in the countersunk depressions. Two small holes, a little over 2 mm in diameter, penetrate the fossil laterally near the lower edge, intersecting the other perforations. This fossil was evidently used for the same purpose as some of the carvings, being perforated in like manner."

OBJECTS OF SHELL.—The usual cups or vessels cut from buscyon and pyrula shells were found at Hopewell. They are of common forms, varying in length from 15 to 28 cm. Quantities of beads were found in the altars and with burials. Those of shell do not differ from the shell beads commonly found in the mounds of the Ohio Valley, so that a detailed description is not necessary. Shell gorgets and shell ornaments were placed in the altars, but were almost completely destroyed by fire. A few fragments were found, but the painstaking attempts at restoration have failed. There are fragments of elaborate relief carvings of birds, animals, and other objects, and of gorgets bearing geometrical or highly conventionalized designs carved with consummate skill. The shell pendant shown in Fig. 43 was found in Altar 2. It is about 4 cm long, and is made from the thick part of a large shell. It would be interesting to know the exact number of pearls recovered from the

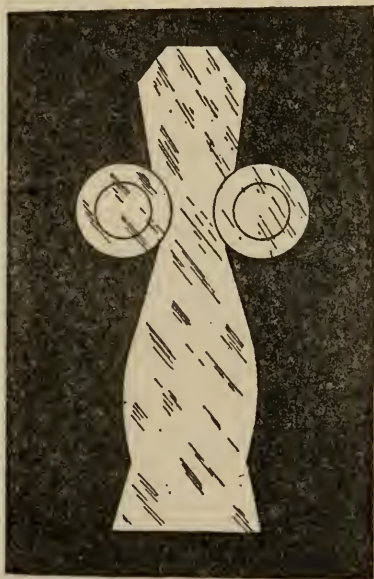


FIG. 39.
Mica Ornament from Altar 1.



FIG. 40.
Parts of Mica Ornaments.

Hopewell mounds. They have never been counted, but I estimate the number at over a hundred thousand. They range in size from minute examples 1 mm in diameter to some nearly 15 mm in diameter. Many

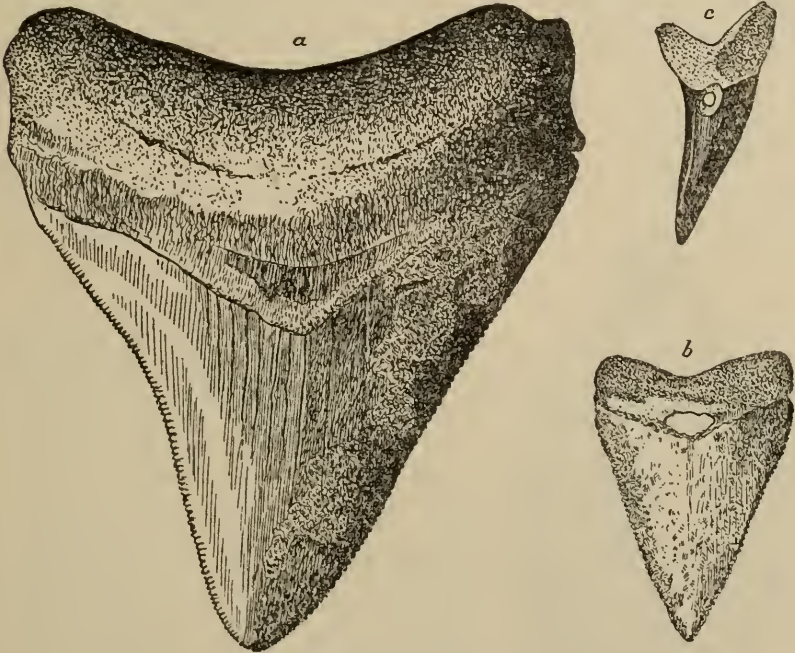


FIG. 41.
Fossil Shark's Teeth Ornaments
(a from Altar 2, b from Mound 17, c from Mound 18).

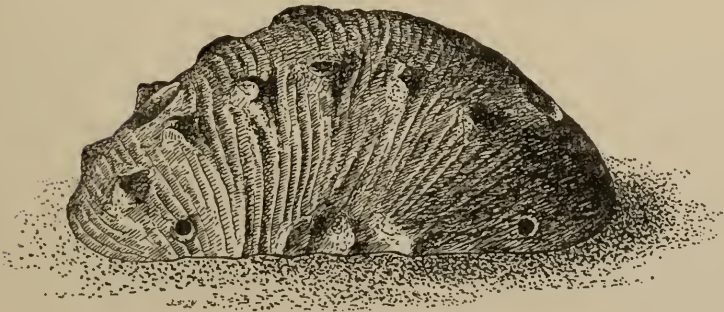


FIG. 42.
A Fossil made into an Ornament from Altar 1.

are perfect, but others are of the inferior grades known as slugs or hinge pearls. G. F. Kunz once informed me that the Hopewell pearls in

their original condition, before they were buried, were worth at least one million dollars. Some of the pearls are shown in Plate LXXX. Many of the specimens were drilled very carefully. There is no evidence that they were perforated by means of a strip of heated copper wire, as has been suggested. A portion of a small drill or meteoric iron was found in one specimen. The drilling of these thousands of beads was certainly a long and laborious process. Willoughby's study of how pearls were drilled is presented in Fig. 44. He makes the following comments:—

"The diagrammatic drawings shown in Fig. 44 illustrate the various ways in which the pearls were perforated: *a*, *b*, *c*, and *d* have single perforations. In *a*, the hole is low upon the side, and the pearl was probably sewn to some object, not strung as a bead. *E* and *f* have a single perforation made by two holes drilled at angles, meeting in the interior of the pearl; *g* has two oblique perforations; *h* has a lateral perforation, and meeting it at right angles is another hole drilled from the bottom of the specimen; *i*, *j*, and *k* have two perforations intersecting almost at right angles. The pearls represented in *l*, *m*, *n*, *o*, and *p*, have cut surfaces which are indicated by dotted lines. In *n* and *p* the bottom is flat, and the edges carefully beveled as though for insertion into a corresponding cavity in some object. Pearls inlaid in bear's teeth occasionally have the lower side cut to fit the cavity in the tooth. Many of the pearls are perforated by drilling from opposite sides, as indicated

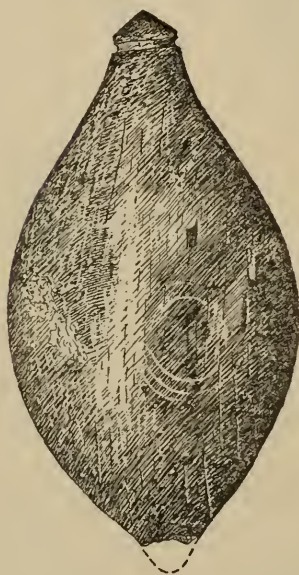


FIG. 43.
An Ornament of
Shell from Altar 2.

by the countersunk holes which usually meet near the centre of the bead. It is evident that a large number of the small and medium-sized beads were penetrated from one side only by a slender drill of copper or meteoric iron, for the holes in many instances are so small and regular they could not have been made with a flint point."

A complete study of this interesting subject has been published by G. F. Kunz,¹ from whose book the following is quoted:—

¹The Book of the Pearl, pp. 485-489 (New York, 1908).

"The use of pearls by the aborigines of the territory now comprised in the United States is proven by their appearance in the mounds and certain graves of pre-Columbian date. This is of great interest in view of the unique system of burial and the great variety of objects buried with the pearls. It is evident from the quantities discovered in some of the mounds that a very great number of pearls, many of large size, must have been owned by these aborigines, and they were evidently quite expert in the art of drilling them. Pearls must have been freely used for ornamental purposes, and it is clear that many rivers in this region must have produced them in great numbers, when we consider that in all probability the mussels

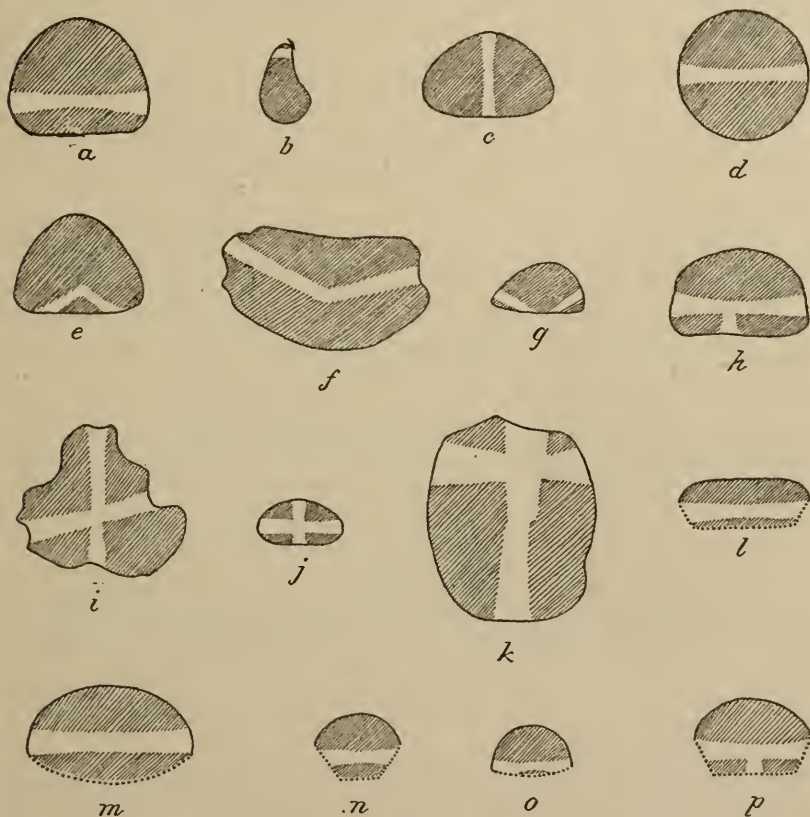


FIG. 44.
Pearl Beads Showing Methods of Perforation.

were taken only as they were required for food or for bait in fishing, and had probably reached their full growth.

"It is not unlikely that pearls were used on this continent for a long period, and they may have been in use centuries before any employment was made of them in Europe. In the age of the mound-builders there were as many pearls in the possession of a single tribe of Indians as existed in any European court. We have no means of ascertaining the precise date of any of these burials, and there are no historical records relating to this region, such as were kept in Mexico, as well as in Europe and Asia. No trace has been found of the employment of pearls, either for decoration

or ornament, by the aborigines of Europe or Asia; either they did not use them, or else the pearls have entirely passed away in the course of twenty or more centuries. We do know, however, that neither pearls nor *Unio* shells were used by any of the lake-dwellers of Switzerland or the adjacent countries.

"It is not unlikely that the Indians of the Atlantic coast may have known of pearls from the common clam, as well as from the edible oyster. The former may have often contained pearls weighing from fifty to one hundred grains each, as at that period the mollusks were permitted to attain their full growth, and perhaps were not eaten, except when they were as small as little-neck clams; the larger ones were sought for the purple spot which held the muscle, and was used for wampum. We have no record of the finding of pearls in any graves north of Virginia, as the many graves opened in the past century have failed to reveal them, nor has the use of pearls been mentioned by any of the early writers. They may have been worn, but if so, they have passed away, or may have been mistaken for ashes if they had decrepitated.

"The first English settlers found the Indians of the tidewater region of what now constitutes the Middle States using pearls quite freely and esteeming them among their favorite treasures and ornaments. Captain John Smith, and all the early chroniclers of the Virginia colony, have given many accounts of this aboriginal use of pearls.

"Pearls of various shapes and sizes were comparatively common, but symmetrical pearls of uniform size were more rare. Strachey writes of having seen 'manie chaynes and braceletts (of pearls) worn by the people, and wee have found plentie of them in the sepulchers of their kings, though discoloured by burning the oysters in the fier, and deformed by grosse boring.' One of Hariot's companions obtained from the Indians about five thousand pearls, from which a sufficient number of good quality and of uniform size were obtained to make a 'fayre chaine, which for their likeness and uniformitie in roundness, orientness and pidenesse of many excellent colours, with equalitie in greatnesse, were verie fayre and rare."

"Those who have examined the thousands of pearls from Ohio mounds, to be mentioned later, can readily understand these conditions. The pearl beads from the mounds vary in diameter from about an eighth of an inch to nearly an inch, the great majority being small and irregular, although there are many among them of good form and value. It is probable that most of the Virginia pearls were obtained from the fresh-water mussel (*Unio*); not unlikely from the common marine clam (*Venus mercenaria*), or the common oyster (*Osireia virginica*).

"As regards the burial of pearls with the dead and their use in religious rites, curious and quite full accounts are given by Strachey, Smith, Hariot, and Beverley.² There was a 'temple,' also occupied as a residence by one or more priests, in the territory of every chief. This building was usually some eighteen or twenty feet wide, and varied in length from thirty to one hundred feet, with an entrance at the eastern end, and the western portion partitioned off with mats to form a sort of sanctuary or 'chancel.' Within this were kept the dried bodies of deceased chiefs, and an image of the god, called Okee, made in the shape of a man, 'all black, dressed with chaynes of perle.' Full descriptions of these idols and their manufacture are given by Hariot and Beverley, also of the process of preserving the remains of the chiefs.³ After the body had been disemboweled, the skin was laid back, and the flesh was cut away from the bones. When this operation was completed, the skeleton, held together by its ligaments, was again inclosed in the skin, and stuffed with white sand, or with 'pearle, copper, beads, and such trash sowed in a skynne.'⁴ It was then dressed in fine skins and adorned with all sorts of valuables, including strings of pearls and beads. The same kinds of treasures were also deposited in a basket at the feet of the mummy.

¹THOMAS HARIOT, A Brief and True Report of the New Found Land of Virginia, p. 11 (Holbein edition).

²WILLOUGHBY, *American Anthropologist*, Vol. IX, 1907, pp. 61, 62.

³BEVERLEY, *History of Virginia* (1722), pp. 167, 186.

⁴STRACHEY, *Historie of Travaile into Virginia Britannica*, p. 89 (Hakluyt Soc., London, 1849).

"Captain John Smith describes the temple of Powhatan, at Uttamussack, which was in charge of seven priests, and was held in great awe by 'the salvages.' At a place called Orapaks, was also his treasure-house, fifty or sixty yards long, frequented only by priests, where he kept a great amount of skins, beads, pearls, and copper, stored up against the time of his death and burial. A vivid account is given of the four grotesque images that stood guard at the corners of this building, all made 'evill favouredly according to their best workmanship.'¹

In the province called Catifachique, De Soto captured an Indian woman who seems to have had authority over the other Indians. He questioned her as to pearls and other valuables. Concerning great numbers of pearls in use in her province, his journal states as follows:²

"The Cacica, observing that the Christians valued pearls, told the Governor that, if he should order some sepulchres that were in the town to be searched, he would find many; and if he chose to send to those that were in the uninhabited towns, he might load all his horses with them. They examined those in the town, and found three hundred and fifty pounds weight of pearls, and figures of babies and birds made of them."

OBJECTS OF BONE, TEETH, AND CLAWS.—A number of bone beads were found, 325 being obtained from Altar 1. The total number was

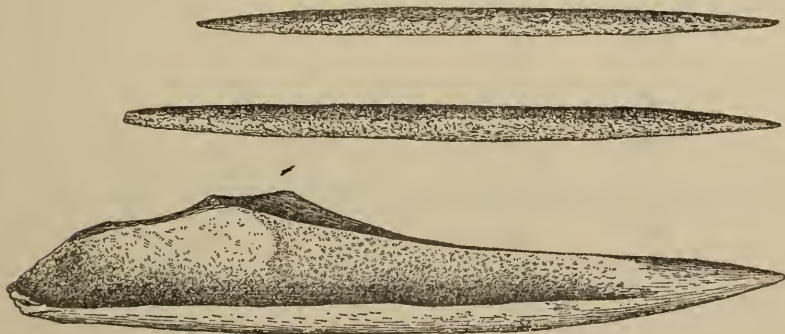


FIG. 45.
Three Bone Awls from Mound 25.

probably about 3,600. Considering the number of skeletons found, they do not appear to have been very popular, probably because they were too common. The beads seem to have been made chiefly from the slender bones of small animals or birds. 690 foot-bones of small animals were recovered from the ashes of Altar 2. They were not perforated, and their use is problematical. A large number of pointed bone tools were discovered, but very few of these could be classed as ordinary bone

¹SMITH, True Travels, p. 143 (Richmond edition, 1819).

²Narratives of De Soto, translation of BUCKINGHAM SMITH, Vol. I, p. 66 (New York, 1904).

awls. They were long and slender, or small and delicate, and had very sharp points. Many of them had been broken while still in the ground, while others had been badly damaged by the altar fires. Fig. 45 shows three of the ordinary bone awls. It is unfortunate that none of the very slender implements were well enough preserved to be studied. Fig. 46 shows fragments of needles. Ten or twelve objects, which were probably used in weaving, were recovered, but all were badly broken. A restoration of one is shown in Fig. 47.



FIG. 46.
Perforated Needles
from Post-Hole
in Mound 25.

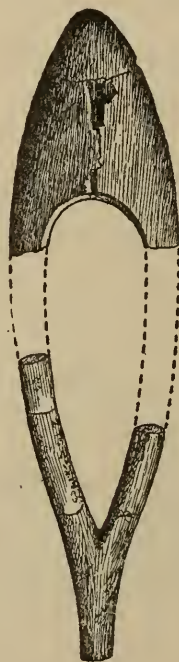


FIG. 47.
Fragment of a
Bone Shuttle.

A few other bone tools were recovered. One of these was a fragment of a human ulna over one end of which there was a small piece of meteoric iron. A band of the same material, 1 cm wide, encircled it a short distance below this. About four hundred bears' claws were found, principally in the altars.

About five hundred cut and perforated bear incisors were originally placed in the various mounds of the Hopewell group. Willoughby made a careful study of these ornaments, and his observations are herewith

given: "Judging from the number of cut or perforated canine teeth of the bear found with skeletons or taken from altars of the Hopewell group of mounds, it would seem that they were highly prized as ornaments, and that much time was employed in drilling, cutting, and ornamenting these trophies of the chase. They may be divided into three classes: the whole teeth perforated and ornamented in various ways, as illustrated in Figs. 49—51; the teeth split lengthwise (Fig. 48); and those cut laterally (Figs. 53—55). Of twenty-eight teeth of the first class found with six skeletons, the majority had two diagonal holes

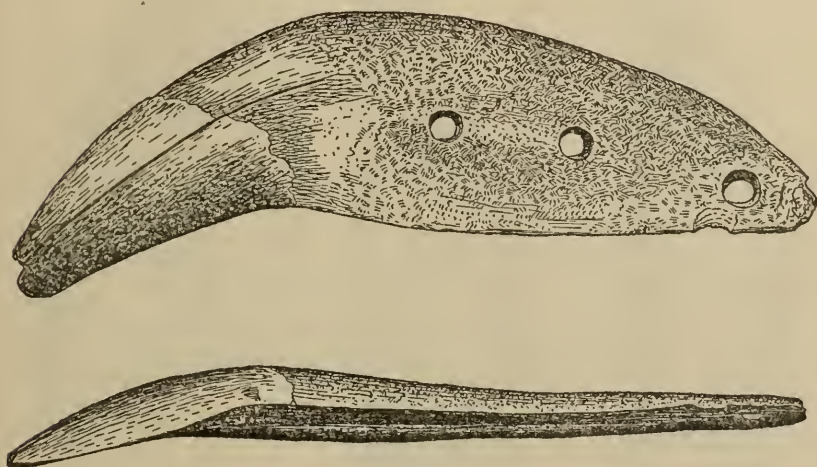


FIG. 48.

Bear's Tooth Split and Made into an Ornament.

drilled so as to meet in the interior of the tooth, as illustrated in the sectional drawing (Fig. 56, *a*, *b*, and *c*) and in the left drawing of Fig. 49. In a few examples the two holes were drilled more at right angles to the length of the tooth, and penetrated the natural nerve cavity. These teeth may have been attached to the clothing as toggles or used as pendants for necklaces. In Fig. 49 are shown three bears' teeth of this class, found with skeleton 248. The central and right drawings illustrate the front side of the teeth, which were ornamented by inserting pearls. The cavity near the upper end of the central drawing probably contained a pearl. Near the centre of the drawing at the right, a deep countersunk hole opens into a similar hole drilled from the opposite side. Both teeth have the perforation for suspension upon the back.

"The tooth represented at the left in Fig. 49 has three countersunk perforations extending to the natural pulp cavity. Below are the two

diagonal holes for suspension. A little to the right of the junction of the diagonal holes is a single perforation into the interior cavity. Near the upper end of the opposite side is a cavity into which a pearl had probably been inserted. In Fig. 56, *f* and *h*, are cross-sections of the two outer teeth represented in Fig. 49, and show the relative position of holes upon opposite sides. Fig. 50 represents both sides of a tooth, taken with several others from skeleton 270. Upon one side are two

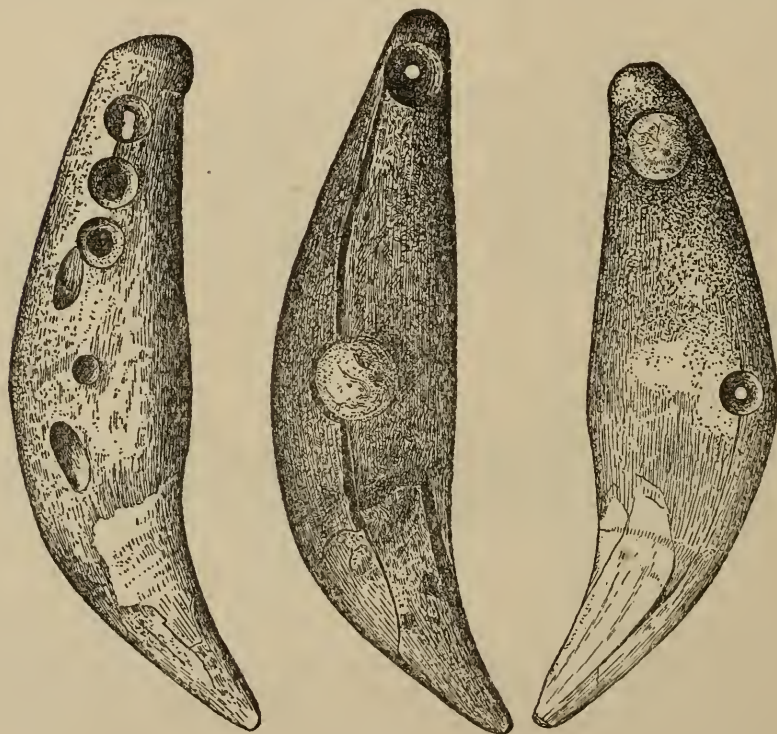


FIG. 49.

Bears' Teeth Ornaments with Pearls Inserted (Specimen on the Left from Skeleton 248, Specimens in Centre and on the Right from Skeleton 209).

countersunk holes opening into the natural cavity. Into these holes two smaller perforations enter obliquely. It is doubtful if pearls were inserted in the larger openings, as the cavities are much deeper and of a different form than those usually drilled for pearls. There are three transverse grooves near the upper end, which do not encircle the tooth. Several of the teeth had become cracked or broken while in possession of the Indians, and had been neatly mended by inserting a bone plug

or dowel. One of these repaired teeth is shown in Fig. 51. The sharp edges caused by the break were carefully rounded and polished. In

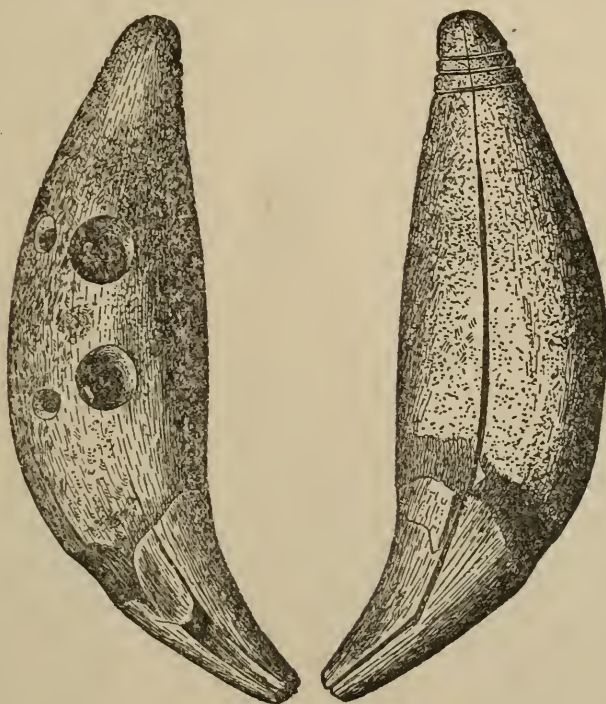


FIG. 50.
Bear's Tooth Ornament, Both Sides Illustrated.

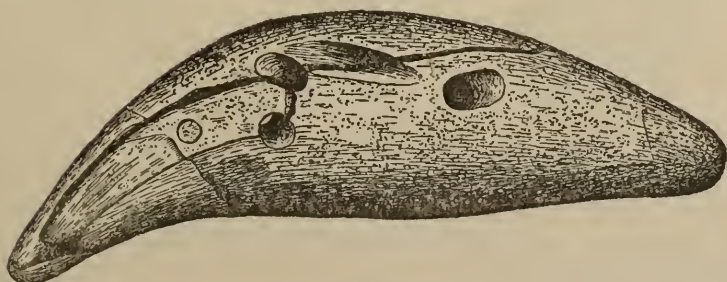


FIG. 51.
Bear's Tooth Ornament.

another example the tooth was split for nearly its entire length, and had been repaired by inserting a dowel which penetrated the tooth laterally

and held the two halves firmly together. This was found with skeleton 278.

"The sectional drawings in Fig. 56 show the various ways in which the teeth are drilled. Usually there is a small perforation extending through the tooth from the bottom of the cavity in which the pearl is placed, as shown near the upper end of *c*, *f*, and *g*. All the pearls found

inserted in the teeth are perforated. It is probable that they were held in place by threads passed through the pearl and the small perforation in the tooth, and fastened there by inserting a small plug. In other specimens the small perforations extend into the diagonal holes through which the suspending cord is passed as in *d* and *a*. This also would allow the pearl to be fastened by a thread. In a few instances, the pearl must have been cemented into the cavity, as there is no perforation in the tooth for the thread; *b* and the lower cavity in *g* are examples. The second class consists of teeth that have been split, or ground upon one side until less than half of the tooth remains. They were found associated with the teeth already described. In Fig. 48 are shown two views of a typical specimen. The cut side is carefully polished, and is perforated by three holes, of nearly the same diameter throughout. There are usually three holes, rarely four; and in a single instance, one small perforation appears near the upper end. The third class consists of bears' teeth cut in the various ways illustrated in Figs. 53—55. The interior of each specimen has been hollowed out, and there is a lateral perforation near the upper end.

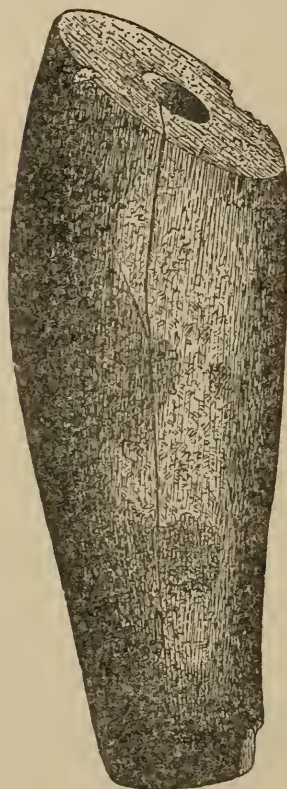


FIG. 52.
Bear's Tooth Ornament
Imitated in Shell.

A similar object, made from the point of a tooth instead of the root, is shown in Fig. 53 *c*. The interior has been hollowed as in the preceding specimen, and a very small perforation extends through the point. This and the following specimen (*d*) were found with skeleton 271.

"The object illustrated in *e* was discovered with skeleton 209. The two diagonal holes, forming the perforation by which the ornament was

suspended, are shown in the drawing. Upon the reverse side is a cavity for the insertion of a pearl. The cut end of the tooth has an oval countersunk depression, and from this a hole extends into the tooth, one and one-fourth inches. *F* and *g* are cut from the root-ends of teeth, and the entire surfaces of both are highly polished. Each specimen has a small lateral perforation at its upper end. *F* also has the longitudinal per-

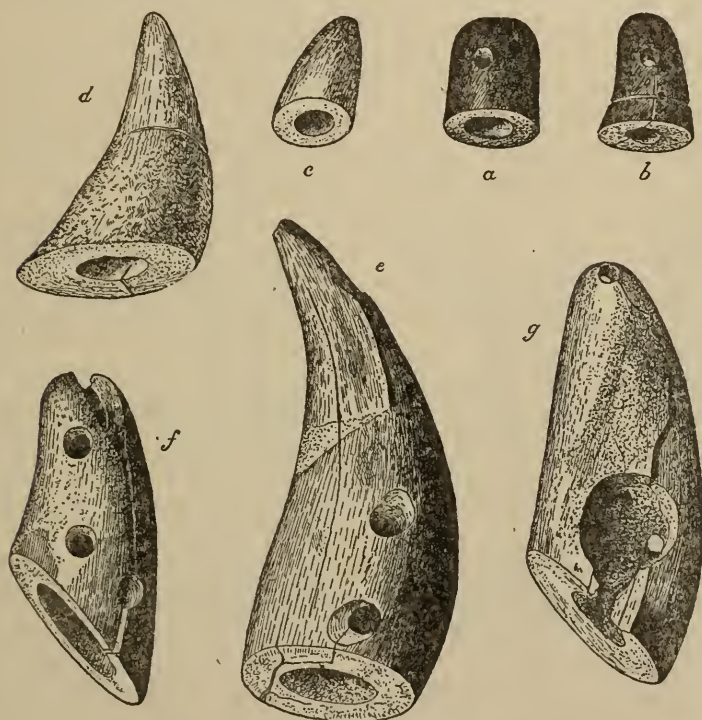


FIG. 53.
Cut and Ground Bears' Teeth Ornaments.

foration and countersunk depression in common with *c*. *G* has the depression of the reception of the pearl upon the side shown in the drawing, and the perforation for suspension upon the other side. It is apparent that *e* and *g* originally belonged to the first class of ornaments, and were subsequently cut into the form shown. The purpose for which these objects were used is, of course, merely conjecture; but it is probable that they formed a part of ornaments composed partially of perishable material. Fig. 54 shows a sectional drawing of portions of two teeth having peculiar perforations. Fig. 55 illustrates a series of pairs of cut

teeth found with various skeletons. The first pair (*a*) are probably the teeth of the panther, and are cut in a peculiar manner. *B* and *c* accompanied skeleton 213 of Mound 23. With this skeleton were found fragments of a remarkably fine textile fabric. The interior of the pair of teeth, shown in *b*, has been removed, and opening into each of these cavities are four perforations. On the reverse side from that shown, the cut ends of the teeth are semicircular instead of straight; and when the teeth are placed together, a hole is formed, about one-half an inch in diameter, into which a pearl may have been inserted. It is probable that these teeth, with cut ends joined, were sewn to cloth or leather. In *c*, the teeth are cut diagonally, and a hole is drilled into the cut end of each tooth at one side of the pulp cavity. *D* and *e* were taken, with

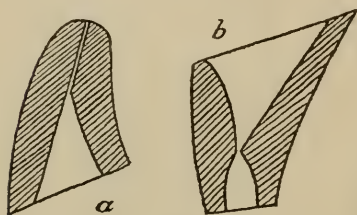


FIG. 54.

Sectional Drawings of Teeth (*a* from Skeleton 241, *b* from Skeleton 277).

other canine teeth of the bear, from the skeleton having the copper head-dress in the form of deer antlers. In *d*, the teeth are simply cut across, as shown in the drawing, exposing the natural pulp cavity. In *e*, the interior of each tooth has been removed, and the cut edges are somewhat disintegrated. The pair indicated at *f* have the natural pulp cavity enlarged, and the cut ends somewhat rounded. There

is a small perforation into the cavity through the wall of each tooth.

"More than one hundred and twenty canine teeth of the bear, cut and ornamented in a similar manner to the specimens illustrated, were taken from the altars of the large mound. These ornaments are fragmentary, and are colored black throughout by the confined smoke of the altar fires. In two specimens, the cavity for the pearl is surrounded by a circular row of small, shallow holes. Not only were the canine bears' teeth cut, sawed, and ornamented in various ways by the builders of the great Ohio earthworks, but they were so highly prized as ornaments that their form was copied in antler, shell, stone, copper, and wood. In a few instances, the counterfeit was so well executed that it deceived professional archæologists."

Fig. 35 (on p. 140) is an imitation bear's tooth made of what appears to be limestone. Fig. 57 is one of a pair of ornaments made of wood, carefully covered with thin copper. One side is imperfect, and a few fragments are missing; but a diagonal perforation still remains which shows that they were fastened or suspended in the same manner as genuine teeth. Fig. 52 is a drawing of an imitation tooth made of a

very compact shell that has been cut across diagonally. A hole, 15 mm deep, was drilled in the cut end. This specimen was taken from one of the altars of the large mound, and was blackened by the penetrating smoke of the smothered fires.

"The most perfect counterfeit tooth in the collection is made of a piece of deer antler, and was taken from skeleton 278 (Fig. 58). Accom-

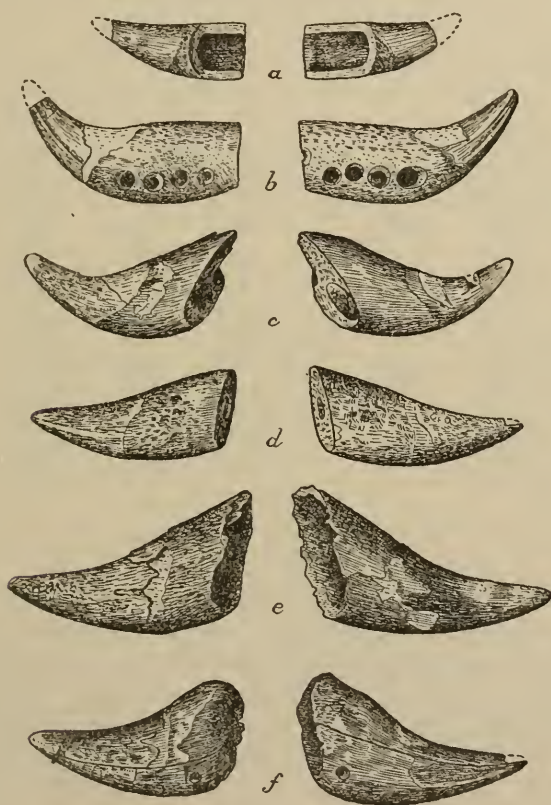


FIG. 55.

Cut and Worked Panther's and Bear's Teeth.

panying this ornament were several genuine bears' teeth, two having inserted pearls. Near the upper end of the counterfeit tooth are two rows of eight shallow holes. Near the centre of the ornament is the cavity for a pearl, and upon the other side appear the two diagonal holes for suspension or for fastening the object to cloth or dressed skin. The root ends of the two genuine bear's teeth, with inserted pearls,

found with this specimen, are decorated with similar double rows of dots, one specimen having fourteen of these shallow depressions, and its companion sixteen. These dots do not encircle the ends of the teeth, but appear only upon the side having the pearls. Here I should like to call attention to the number of well-executed carvings on both bone and antler, which were found with this same skeleton 278. Many of the canine teeth of the wolf, fox, opossum, and other mammals, with one perforation near the end of the tooth, were taken from the two altars in the large mound. Some of these small teeth have the two diagonal holes upon one side for the passage of the thread, which probably secured

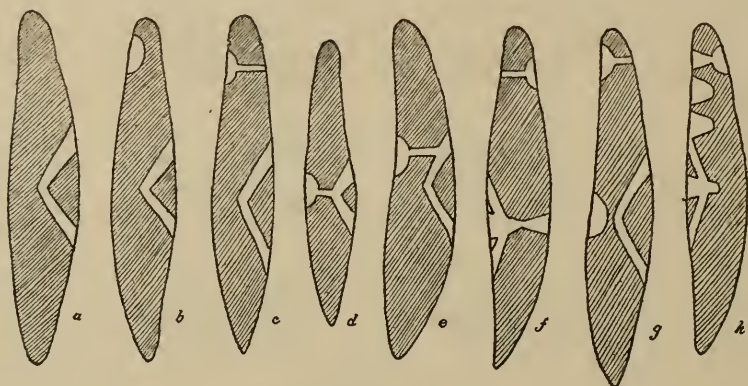


FIG. 56.
Outlines Showing Perforations in Bears' Teeth.

them to the ancient dress of their owner. Over five hundred of the canine teeth having a single perforation were found with skeleton 207 in Mound 23. Several are still held in place by a lump of clay, which shows them to have been strung upon a cord when deposited with the body. Fragments of the cut jaws of the bear, deer, lynx, fox, and man, were taken from the altars or found with skeletons."

CARVINGS ON BONE.—The number of effigies and bone tracings found leads us to conclude that the Hopewell people possessed many of these artistically carved objects. Those placed in the altars had suffered more than any other objects, except possibly the shell gorgets, and most of those shown in Figs. 59—68 have been restored. The specimen in Fig. 59 has been partly broken, but enough remains to show a design similar to some of those upon sheet copper. At one end are what appear to be bears' claws, or a bear's-foot symbol. The broken end appears to have borne a different design. Fig. 60 shows a bird's head carved from either bone or antler. There is a small perforation for suspension at

the back of the neck. Fig. 61 is a bird's head, quite raven-like in character. It probably formed part of a hollow object, the rest of which was destroyed by the fire. A pearl had been inserted in the eye-socket.

Fig. 62 shows three examples of bone carving; *a* is made from the femur of some large animal, and was probably the handle of a ceremonial

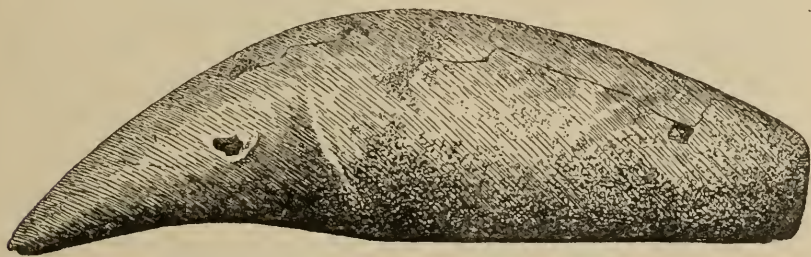


FIG. 57.

Imitation Bear's Tooth in Wood Covered with Copper from Skeleton 177.

implement. The surface has been scraped, and the joint cut in the form illustrated. The interesting feature is that a thin strip of meteoric iron was placed across the end, and a band or ferrule of the same material fastened around and riveted. A portion of the iron which still adheres is shown in the drawing. Fig. 62 *b* is a fragment of a delicately incised bone object of unknown use, while *c* is the end of a well-polished object.

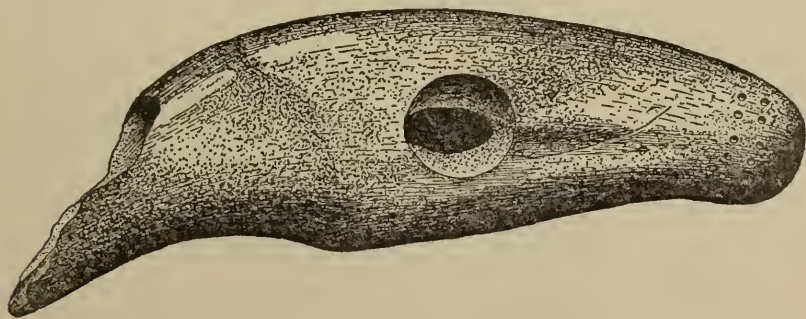


FIG. 58.

Imitation Bear's Tooth Carved from Antler from Skeleton 278.

Fig. 63 *a* represents a bird whose species cannot be identified. It is one of the most spirited designs found. Fig. 63 *b* shows the complete design of the same object. Fig. 64 is a carving of an occlot of which Willoughby says, "This carving, only a portion of which could be found, is beautifully executed upon what appears to be human bone. The

larger end is cut and ground. The design appears to have been carried beyond this present end, and it may have been broken and ground down by the aborigines. The opposite end shows fractures caused by the altar fires. The design does not appear to have been carved further on this end; but, as several pieces are missing, it is impossible to tell this with certainty."

With reference to Fig. 65, Willoughby states, "The most interesting carving in antler is here shown. This is probably intended to represent a bird of the hawk family, judging by the notch in the upper mandible. A conventionalized human face is drawn on the head. This might be considered merely the indication of a crest, but I do not think that it was so intended. The terminations of the wing covets are conventionalized, the carving is hollow; and the perforation on the back, shown in the drawing, communicates to this opening. This specimen is finely finished, and doubtless had pearls inlaid for eyes. A fragment of another very interesting antler carving, shown in Fig. 61, represents the head and shoulder of one wing of a raven. Enough of the body of the bird remains to show the hollow opening usually present in this style of work. The perfect specimen represented the body and head of this bird. A portion of the reverse side of the head from that shown is missing. A pearl still remains in the eye-cavity. It is probable that the eyes of most of the carvings that have a hollow eye-cavity were inserted or represented in the same manner. Single fragments of several objects of the same character were found, the rest being utterly ruined by altar fires." Figs. 20 and 21 on p. 128 (the latter illustrating the separation of the design into parts) show one of the most interesting

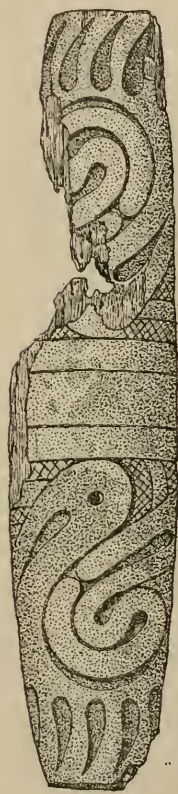


FIG. 59.
Carving In-
cised on Bone
from Mound 25.

objects found. Willoughby observes in regard to it, "This is the most remarkable incised carving recovered during the exploration and one of the most interesting yet obtained from the mounds. The bone, probably a portion of a human femur, has been artificially shaped and polished, the upper end scalloped, and its natural cavity enlarged. This specimen accompanied a skeleton in the great mound. The drawing illustrates the back of the carving (Fig. 20). An analysis of the

complete design appears in Fig. 21. Unfortunately the bone was broken, and a few pieces were not recovered. A small part of the design, the lower central portion, could not be wholly restored. The

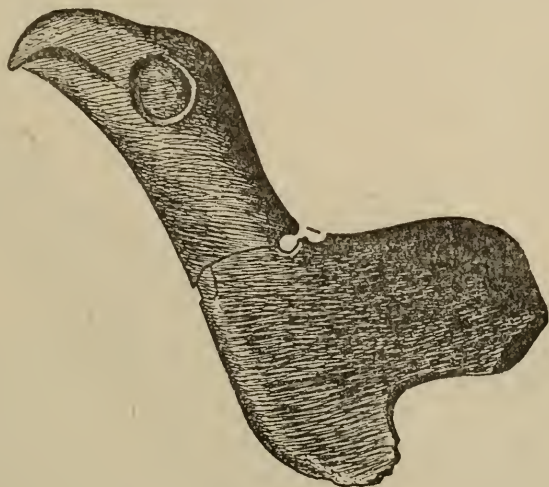


FIG. 60.
Bird's Head Carved from Bone.

restored part is indicated by broken lines. It is difficult, at first, to discover any intelligible design in this medley of lines. A strange mixture of human and animal faces appears in company with circles, ovals, and

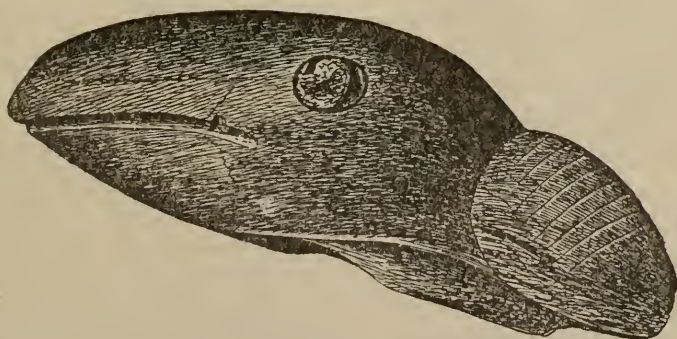


FIG. 61.
Bird's Head, Probably a Raven, with a Pearl Inserted in the Eye.

other forms. A careful study of the carving, aided by tracings and by comparison with similar objects from the great mound, shows that an elaborate mask, or a combination of masks, is represented. The mask

proper is surmounted by a pair of antlers, in form very much like the copper antler, illustrated in Plate XLIX, which was probably a part of a similar mask.

The two copper head-dresses found in the large mound have already been mentioned. The other one, with the horns just sprouting, or in the velvet, is shown in Plate LXXI. Willoughby states, "Both of these

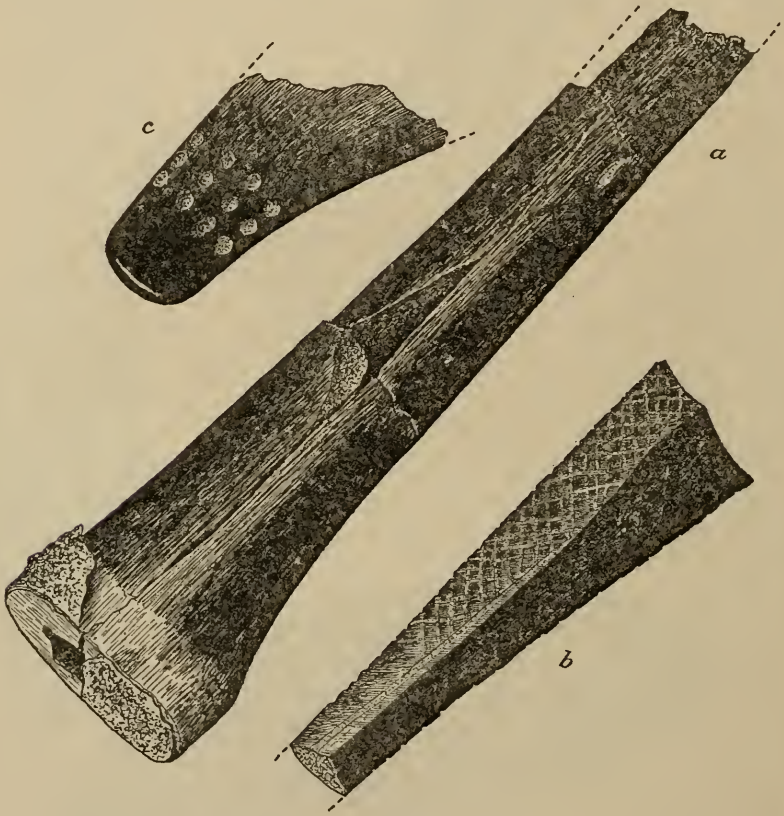


FIG. 62.
Decorated Bones from Altar 2.

forms are indicated in the incised carvings shown in Figs. 20 and 21. These tracings show that the carving is not merely a mixture of meaningless lines, but is a combination of several heads drawn within a prescribed limit, so arranged that the outline of one face forms parts of other heads or faces."

Many incised carvings of the same character of those recovered were

placed on the altars of Mound 25. None of these can be restored, which is unfortunate; for, if we had them restored, we could form much better and more complete conclusions concerning these people.

Fig. 66 shows one of the largest carvings of human figures, the face being partly destroyed by contact with a mass of copper. It is ebony black from the fire. Willoughby thinks that this was the head of a baton, but the lower part is missing. There appears to be a head-dress of some sort, and it is interesting that the human heads found show several different methods of hair-dressing. Fig. 67 shows another head, probably also from a baton. The top of the head is apparently covered with a flat object. The ear is perforated in four places, probably for the attachment of ornaments. At the back of the head is a perforation



FIG. 63a.
Tracing of a Bird's Head on Bone.

less than 3 mm in diameter in which a plug of bone or antler is inserted. Some of the heads illustrated by Squier and Davis have a similar perforation.

In regard to Fig. 68, Willoughby observes, "The most noteworthy striking carving of the human figure recovered during the exploration is wrought from ivory, and like all of the ivory (fossil mammoth ivory) carvings from the altars, is very badly injured by the heat. A portion of the face is missing, the arms and other parts of the body are broken and the lower extremity of the sculpture destroyed. A convolute tattoo mark appears upon the cheek. An incised line across the upper part of the forehead marks the hair line, or indicates the front edge of a head-dress. Back of this line are two ear-like ornaments, one of which has been broken. An appendage analogous to the same feature in Fig. 67 projects from the back of the head. This is also broken. The hair is gathered into a large chignon, and is apparently confined in a net. The meshes of the net seem to be represented by incised lines.

From the bottom of the chignon, and extending downward along the back, is a nearly flat projection which widens as it descends, and upon this falls a cue-like object with its lower end missing. The lower lobe of the ear is much distended by the insertion of a long curved ornament, evidently of the same form and material as the ear-pendants obtained from each side of the neck of a skeleton in the large mound (Fig. 69). A scarf-like object hangs from the neck with its lower end broken. Upon the uninjured portion is delineated a zigzag line; upon either side are two dots; below are two horizontal lines, and between these lines are three additional dots arranged in a row."

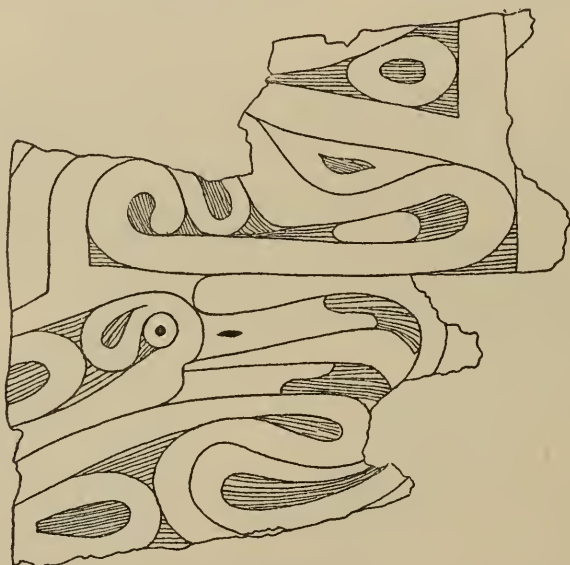


FIG. 63b.
Both Sides of the Engraved Bone.

While many artifacts have been recovered from the Ohio mounds, models or representations of human figures are few. Therefore, those of terracotta from the Turner group, together with the ones illustrated above from the Hopewell group, give us some little insight into the mode of dress, method of wearing the hair, and the use of certain ornaments among the ancient people of that region. The lines on all the bone objects are well executed. This is particularly true of the many fragments recovered from the site of Mound 1, and it is most unfortunate that the many bone tubes evidently placed in it were destroyed. The numbers of effigies and bone tracings found lead us to

conclude that the Hopewell people possessed many of these artistically carved objects.

Comparisons might be drawn between the Hopewell design and some of the carvings found in Florida and on the Northwest Coast. One of the interesting features, however, is the parallel between many of these carvings, containing the square and circle, and the earthworks of the Ohio Valley. It has been suggested by many writers that the works

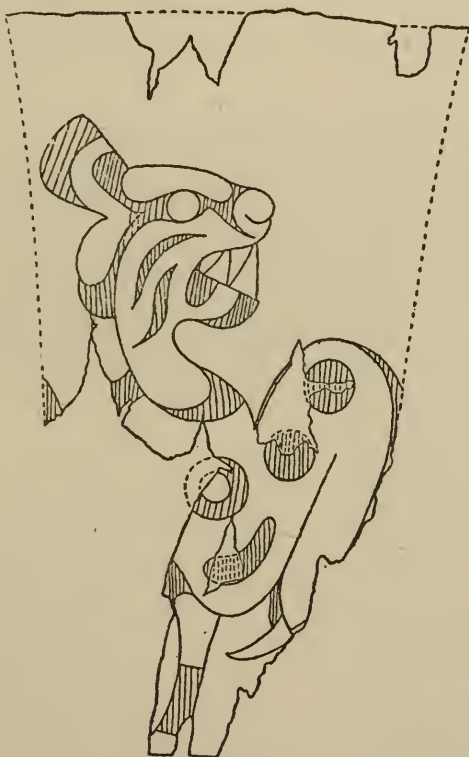


FIG. 64.
A Drawing of an Ocelot upon Bone.

were of a religious or symbolic character, and certainly their form gave little protection to the villages enclosed. Sufficient numbers of carvings have been obtained from the Turner, Hopewell, and other groups to indicate quite clearly that, while many of these designs represent conventionalized human beings or animals, others indicate the form of the earthworks or enclosures themselves.

POTTERY.—Pottery was not common in the Hopewell group,

although a number of fragments were found on the village site and scattered through the mounds. The amount recovered is not to be compared with that from the Baum site, ten miles distant, or from sites of the Fort Ancient culture. We cannot determine from the field evidence whether the utensils of the Hopewell people were made from wood, basketry, etc., but they seem not to have used pottery as extensively as the other tribes of the Ohio Valley. We have not sufficient Hopewell pottery to positively determine by what tribe it was made, but such as I have seen seems to indicate that it is early Algonkin. The pottery jars found by Squier and Davis in other mounds do not appear to be of

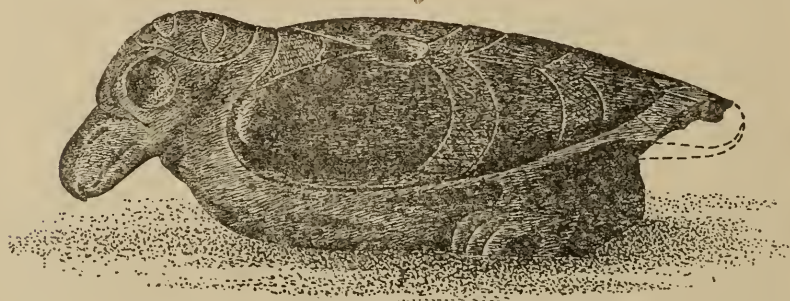


FIG. 65.
Effigy of a Bird Carved from Bone from Altar 2.

Madisonville or Fort Ancient type. The Hopewell pottery is certainly not southern, and none of the southern forms of bottles, effigies, etc., are found in the Scioto Valley. This is significant as indicating that although the Hopewell people obtained flint, mica, sharks' teeth, and ocean shells from the south, their art was not effected by the prevailing southern forms.

An ordinary cooking-pot was found in the village site. Restored, it is about 14 cm in height and 13 cm across the top in diameter. It is the ordinary village site type and carries no significance. Willoughby states that "fragments of a number of pottery vases were taken from Altar 1. Enough pieces were found of one to show the original form (Fig. 70). The walls of this vessel have a nearly uniform thickness of a little more than 6 mm. The clay had been mixed with pounded quartz. The bottom is slightly rounded, and the upper part of the rim is ornamented by notches. For a depth of 24 mm the outer edge of the rim is ornamented with parallel incised lines, and these are crossed at intervals by a group of other lines drawn at right angles with the first. Beneath this band is a single row of depressions encircling the vase, probably

made by pressing the end of a small twig into the soft clay. Less than an inch below, three shallow grooves, about 5 mm wide, encircle the pot, and under these are the zigzag lines found so often in the archaic Algonquian pottery of New England. The unornamented portion of the exterior shows careful smoothing. The height of this vase is 22 cm, and the rim is 21 cm in diameter. Fragments of two other vessels were taken from this altar, but too few to restore the vases. Judging from portions of the rims, one was about 20.5 cm in diameter at the top, and was very rudely made, with no attempt at decoration, of the ordinary round-bottom form. Some of the fragments had indistinct cord-markings. A third vessel was somewhat smaller. The curvature of the rim fragments would indicate a vessel with a diameter of about 15.5 cm at the opening, with walls averaging less than 6 mm in thickness. With the exception of a space of 3 cm below the rim, the fragments were thickly covered with marks of twisted fibre cords. In these pots the clay had been tempered with powdered stone."

The northernmost place in which a cemetery containing typical middle Mississippi Valley pottery was found, is that at the mouth of the Wabash River, southern Indiana, where a survey conducted by the Phillips Academy found about a hundred jars, bottles, and bowls.¹

OBJECTS OF BURNED CLAY.—Eight objects of burned clay are shown in Fig. 71; *a* is probably a form on which sheet copper for ear-busks was worked.

The groove was made by pressing a thin, straight shaft of some sort into the clay before baking, and extends about half-way

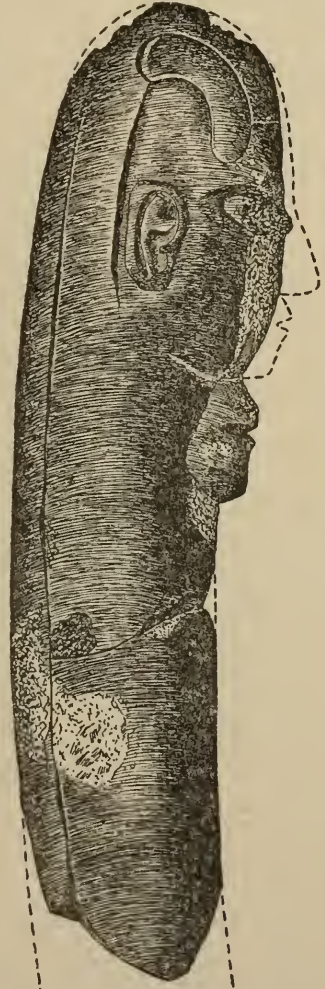


FIG. 66.
Human Effigy in
Antler from Altar 1.

¹*Bulletin of the Phillips Academy*, No. 3, pp. 72—86.

through. Fig. 71 *b* is a similar, but small form, with a shallow groove and flat base. Fig. 71 *c* is still smaller; and the groove, which appears to have been gouged out, does not run clear across. Its ungrooved side is slightly convex. Fig. 71 *d* and *e* have a flat base and coneshaped top. Fig. 71 *f* is perforated, and is probably a large bead, although it could have been used as a form to work copper on. The perforation is larger at one end than the other as though a bone awl had been

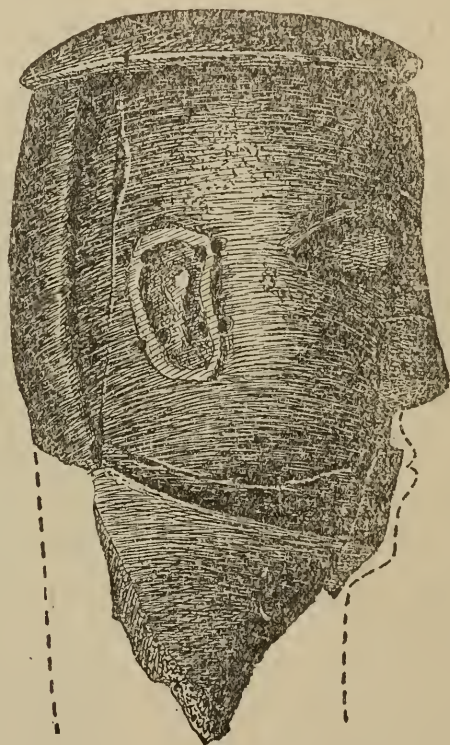


FIG. 67.
Human Effigy in Antler from Altar 2.

pushed through it, while the clay was still soft. Fig. 71 *g* is an ordinary globular bead, and *h* is a flattened bead. All the objects are hard burned and brick-like in solidity. Traces of copper still adhere to some of them.

TEXTILES.—Both in the altars and with burials, there were numerous traces of textiles which had been preserved either by charring or by contact with copper or meteoric iron. From these we may gain a slight clew to the character of the garments worn by the ancient people.

Skeleton 248 had been dressed in a skirt of finely woven cloth extending from the waist to the knees, to which had been sewn pearls, bears'-teeth, and other ornaments. Plate LXXXI shows a copper plate which is entirely covered with imprints of cloth. Some of the threads and fibres are still adhering. Fig. 72 illustrates various examples of textiles. Those in *a-e* inclusive represent the fabric in approximately actual size. The left-hand drawings show the details of the weaving considerably enlarged. The specimens *a*, *b*, *g*, *h*, and *i*, are all twine-woven. In *a* the method of holding the warps in alternating pairs produces a lattice-like open-work effect. In *g* and *h* an open texture is achieved

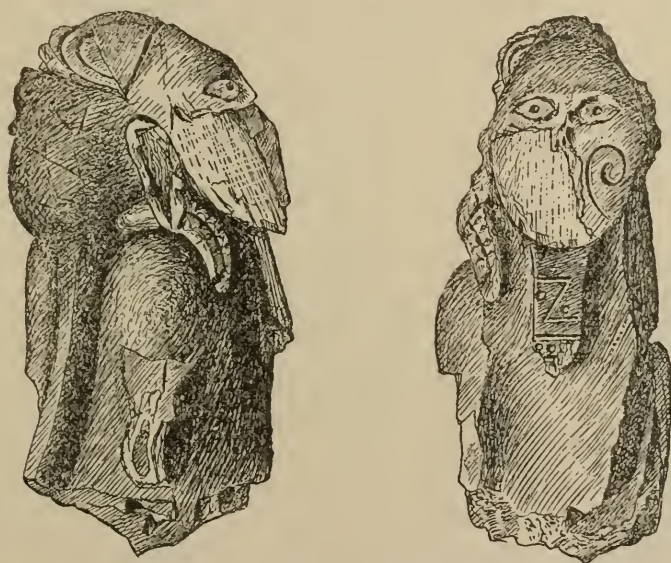


FIG. 68.

Human Effigy Carved from Ivory or Shell from One of the Altars.

by a relatively wide spacing of the warps. The "watered" appearance of *i* is due, as is brought out in the illustration, to a skilful weaving of warps during the twining process; *c* is twilled, the order being over one and under two; *f* is a plain close weave with primitive re-entering selvage, which lacks an edge cord; *b* and *e* are fine examples of coiled netting.

Willoughby has made a study of the weaving of the Hopewell people. Concerning one fragment from Altar 2 he remarks, "Judging from the finished upper edge, it would seem that, in weaving, the upright lines of the warp were carried back and forth in pairs, the loops at each end

passing around pins set at equal intervals. By this method, two continuous threads of sufficient length would constitute the warp, and the loops at each end would form the ornamental edge shown in the drawings."

Comparing the Hopewell cloth with that from other mounds, but more particularly with the few examples of prehistoric cloth we have, and with similar cloth in use among the historic Indians, the suggestion has been made that for the coarser grades the bark of the cedar, willow, or other trees was used. For the finer varieties they may have used milkweed or nettle, or possibly the fibres of the dogbane. I do not believe that cotton cloth was used in the Scioto Valley.



FIG. 69.
Shell Ornament
Found with
Skeleton 278.

WOODEN OBJECTS.—As copper was melted, bone greatly damaged, and shell destroyed by the heat of the altar fires, wooden objects were completely destroyed. Carbonized fragments of wooden bowls were found in both altars, and a careful examination of these indicates that they were carved with designs similar to those upon the engraved bones. There were also a few fragments of wooden rings, very much like the stone rings.

The wood used was probably maple or cherry, but identification is difficult, as the grain is almost destroyed. One cannot doubt that the Hopewell people made use of wood even more freely than of copper, bone, or shell; and it is unfortunate that none of their wooden utensils or artifacts have survived.

SEEDS.—Several hundred small seeds, many of which had been perforated as if for use as beads, were found in a matrix of charred bone and melted copper. It is hard to understand why they were not consumed by the heat of the fire.

We are placed at a disadvantage since our studies of prehistoric artifacts are confined to those of metal, stone, clay or bone, including few shells. Wood was much more easily workable. We should not conclude that the Hopewell people's art was confined to objects wrought from refractory materials. Many fine examples of primitive wood carving doubtless existed.

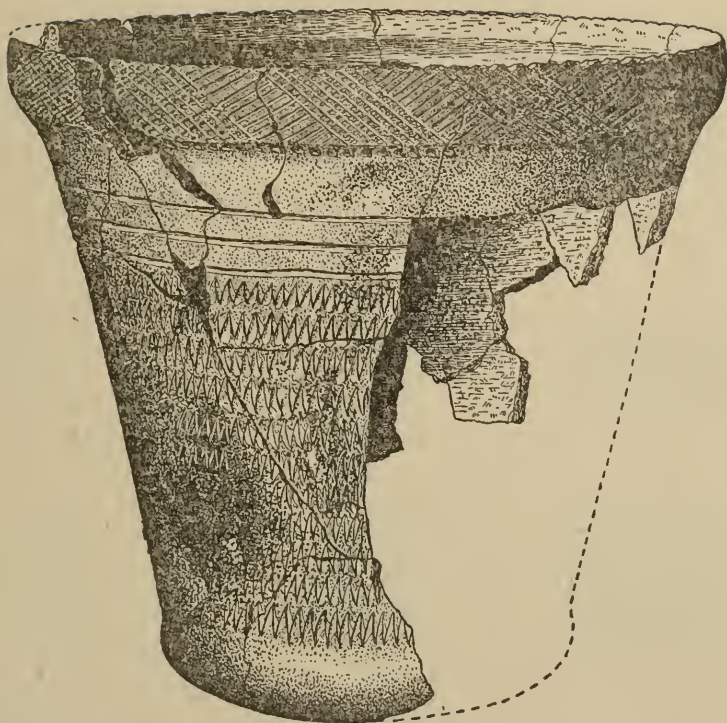


FIG. 70.
Restored Pottery Vase from Altar 1.



FIG. 71.
Clay Buttons or Beads from Mound 25.

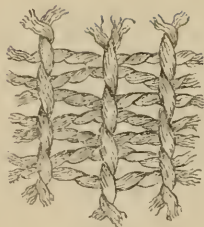
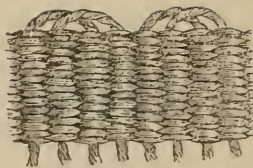
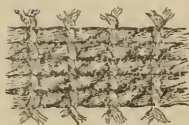
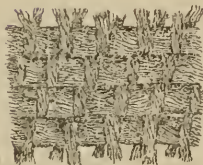
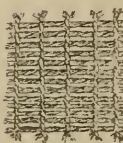
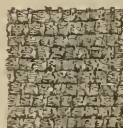
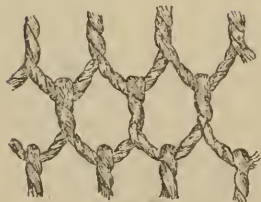
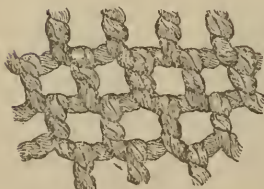
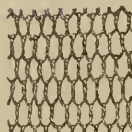
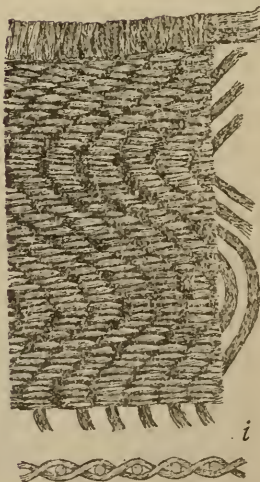
*a**f**b**g**c**h**d**e**i*

FIG. 72.

Fragments of Textiles from Hopewell Mounds.

CONCLUSIONS

Since the Hopewell explorations, extensive researches have been carried on among the mound groups in the Mississippi Valley and the South. Although several archæologists have lamented the delay in the Hopewell publication, there is this to be said in favor of a long-deferred report. We are now able to make comparisons between the Hopewell and other mound cultures, whereas, had this report been published shortly after the end of the Columbian Exposition, observations would naturally have been limited to Madisonville, the Turner group, and Fort Ancient.¹ Practically every one agrees with reference to the two sharply defined cultures of southern Ohio, which are now designated as the Fort Ancient and Hopewell cultures. An admirable study of these was published by H. C. SHETRONE.¹ In addition to these I think we should recognize a third, the glacial-kame culture. This may be closely related to the Fort Ancient culture, yet insufficient work has been done to positively identify it. It is based upon numerous interments found in gravel hills of glacial formation, common in central and southern Ohio. Most of the artifacts found with these seem somewhat different from those of the Fort Ancient culture. None of the gravel knolls near the Hopewell group contained burials, but it might be well for some one to extend researches in this direction to points several miles distant from it.

Though the length and breadth of the State of Ohio the Fort Ancient culture seems to have obtained. In fact, it surrounded the Hopewell culture. The latter was highly developed locally in the various sites, where the great earthworks of the valleys are situated, but was compact or concentrated, while the Fort Ancient culture was widely distributed. All the great groups belonging to this culture are within a hundred miles of Hopewell. The great works at Newark are at about this distance by Indian trail. All the characteristic Scioto Valley enclosures: Mound City, High Banks, Liberty, Circleville, etc., are from eight to twenty-five miles away. Runners could reach most of them in one and a half to five hours time, and even the most distant in two days.

¹Attention is called to the very able report recently published by HOORON and WILLOUGHBY, Indian Village Site and Cemetery near Madisonville, Ohio (*Papers of the Peabody Museum of American Archaeology and Ethnology*, Harvard University, Vol. VIII, No. 1, Cambridge, 1920).

¹*American Anthropologist*, 1920, p. 144.

Mound city, where Squier and Davis made their famous discovery of two hundred pipes is only eight miles east of Hopewell by trail.

Since this report was written, Mills has examined the remaining tumuli. His observations are not yet published, but it is known that he recovered a wealth of material much of which was an exact duplicate of the Hopewell finds. He also found forms in copper not discovered elsewhere. Notable among these are human heads and double-headed eagles. We found in the Hopewell altars some small mushroom-shaped objects of copper; and several, which were larger and with longer stems, were discovered by Mills at Mound City. Mills concludes that they portray the deadly *Amanita*, and we concur with him in this theory.

Whether all the villages of the Hopewell culture grouped in Ross County, where most of them are located, were inhabited at the same time, is not positively known, but I believe that they were. Their inhabitants were probably of the same stock, speaking a common language, as their art-forms are identical. I was formerly under the impression that the famous Serpent Mound did not belong to the Hopewell culture, but apparently it does, and my former statement to the effect that its builders are connected with the Fort Ancient culture may be incorrect.

Whether the Hopewell people were exterminated by the Iroquois previous to the coming of the French into Canada, and were the people variously mentioned in Leni Lenape and other traditions as the Snake people or "earthwork people," is not positively known, but I believe that they were. Apparently they asserted great influence, and dominated aboriginal life in southern Ohio. While there is no positive evidence that they were at war with the Fort Ancient culture people, it is not beyond the bounds of probability.

I do not believe that the Hopewell people were in existence, when certain mound-building tribes of the south were seen by La Salle and Tonty. So far as it is possible to reconstruct Hopewell life, it would appear to have been more or less parallel to that of one of these tribes. Tonty speaks of large dwellings placed in regular order around an open area, and he refers to treasures, such as pearls and copper eagles. In the centre of a large structure he observed an ocean shell and other things of interest. It is my opinion that the dwellings were grouped about a common square at Hopewell, although this cannot be positively determined. The soil has been continually cultivated for more than a century; and traces of these dwellings, as well as of sun-dried bricks (if such were used), have long since disappeared. Squier and Davis mention remains of burnt clay or sun-dried bricks in connection with some

of the earthwork; and it is quite likely that the walls of certain of the squares, octagons, and circles were faced with small masses of dried clay.

Undoubtedly there were surface indications to be observed in Atwater's time which have long since disappeared. He speaks of strange things which were observed on the surface of the enclosures about the year 1800, when they were first brought under cultivation. Whether he means fire-places, or primitive shrines, or accumulations of stone, we do not know. It is unfortunate that he was not more specific.

The length of occupation of the Hopewell site is unknown. It has always been my impression that the culture developed there during a number of generations. I do not believe that there was a large population, but rather a village of closely related clans, fratrics or families, which occupied the site for a considerable time. The length of occupation of the Hopewell site naturally cannot be determined. It might have been sometime between the years 1400 and 1500. I have always been inclined to think that it was prior to 1550, but am not disposed to place the date before the year 1400. It was naturally abandoned before the French and English explorations, otherwise such an important site would have been visited by Europeans. Taking into account the way Indians lived, there was probably room within the walls for 1500 to 2000 persons.

The question has been asked whether it is possible to make a distinction between the dates of the burials in different mounds. This cannot be done, except in the case of intrusive burials. The central burials in each case were probably the oldest, others being added on the base line, as the mound was extended. The exploration of Mound 25 indicates that it was sometime, before this structure reached its greatest dimensions, probably two or three generations, and possibly three or four.

It is generally supposed that the Hopewell people were brachycephalic. This cannot be determined positively until accurate measurements are made. Dr. H. T. Cresson advanced a statement to that effect, but his observations were based upon a hasty field examination. He pointed out to us, however, a few crania which, as any observer could see, were longer than the prevailing short types. With these long-headed burials there were no copper ornaments, pipes, or other objects of value. From our field observations it seems probable that these long-headed people were slaves or enemies, and were buried without honor. Careful tabulation of the crania and a checking up of the objects found with each might settle this point.

Squier and Davis worked for years in southern Ohio, and it now

appears that they were right in their contention that the life and customs of the Hopewell culture people were quite different from those of the later Indians. At this time we may not subscribe to their enthusiastic claim that it was a civilization, but we must accord them a full meed of praise; for more than seventy-five years ago they discerned that the culture was peculiar and distinctive. When describing the various art-objects found, attention was called to the skill and art-sense evinced in their manufacture. Some of them seem beyond the ability of a barbaric people. Some of the quartz crystals, for instance, are perforated with holes a scant millimeter in diameter. McGuire was able to drill in stone and metal with aboriginal tools, and his observations are of great value; but I doubt his ability to drill quartz crystals.

It is not necessary in these pages to enter into a discussion of cosmic symbols, yet there is abundant material for such study in both the Hopewell and other mound collections. Many of the early writers on American archæology thought that works of the type described on these pages were erected for religious purposes. One author suggested that within the square enclosure a certain clan resided, or perhaps the clan elders, and that another clan lived within the large circle. Several writers have observed that the Hopewell walls, mounting as they do from one terrace to another, did not afford protection against an assault by enemies. Other enclosures are so constructed as to give little protection to the village within. In the light of modern explorations it seems safe to assume a religious character for most of these squares, circles, and geometric figures. It is difficult for us to always grasp the Indian's point of view, but it seems to me that the people who built the Hopewell, Turner, Liberty, Mound City, and other groups depended upon the potency of their "medicine," quite as much as on the strength of their walls or the courage of their warriors. In brief, they erected around their village clan groups or sacred buildings, these squares, circles, and other combinations, all of which were suggested by their religious beliefs.

There is no evidence that the Hopewell people had domestic animals, and no bones of the prehistoric dog were found in the village site.

The most interesting question, that with reference to the origin of the Hopewell people, cannot be answered. We cannot at present assign to them positive classification under the Algonkin; yet their pottery and other artifacts seem to indicate that they were quite likely of that stock. At one time I was of the opinion that these Indians came from the south and moved northward. I now believe that after their defeat by the Iroquois the remnant of them moved to the South, and mingled

with the Indians of the Tennessee or Cumberland Valleys. This belief is based on the following observations: Had the Hopewell people come from the south, they would probably have brought with them a knowledge of the construction of stone graves, and as limestone slabs are common in Paint Creek, some of the burials would have been made in these stone coffins. Also, they would have brought with them knowledge of southern pottery, which is superior to northern pottery, and is of different form. Further, they would have introduced the southern form of tubular pipe, as well as some of the small clay and stone disks so common in Tennessee and Kentucky. Shell disks or tablets would also have been in evidence. Several of the long, highly-specialized "swords" or flint maces, of which numbers have been discovered in the burial places of Tennessee and Kentucky, would undoubtedly have been present at Hopewell. None of these things were found. The Hopewell pottery is distinctively northern, not southern. In the mounds and graves of Kentucky and Tennessee, we find pipes similar to the Scioto Valley forms and other objects, indicating that some people came in who were familiar with the northern art, or that such art-objects were obtained by exchange. It will be immediately suggested by students that the presence of mica, sharks'-teeth, and ocean shells indicate southern migration or origin. I think not, but, on the contrary, am convinced that these foreign objects came in by exchange or by traders, who travelled considerable distances.

The reports covering Mills' extensive and important explorations in the State of Ohio clearly indicate that the culture is northern rather than southern; yet, that a great deal of material was brought in from the south. In brief, the Hopewell culture was somewhat affected by a knowledge of the south, whereas the mound groups of the south do not appear to have been influenced by knowledge of the culture of the north. There were more southern objects in northern mounds than northern-made artifacts in southern mounds.

During September-October, 1921, and March-April, 1922, I made preliminary inspection of the Cahokia mounds near East St. Louis, Illinois. A number of these tumuli were explored. Fifty-two skeletons and numerous artifacts were recovered during the course of exploration in the mounds, villages-sites, and cemeteries. Researches have not progressed to a sufficient extent to draw definite conclusions, but it appears that Cahokia is the largest group of mounds indicating dominant southern culture north of the Ohio river. That is, at no other point in the north is southern culture so evident. An examination of six or eight of the mounds, two of which were of considerable size, would

indicate that the Cahokia people were quite different from the builders of the Hopewell group. There are some indications of a mingling of northern and southern cultures, yet it is premature to make the statement positively.

Mound 25, as seen by Atwater, and Squier and Davis, was the nearest approach to the pyramid type that existed in the State of Ohio; yet it is scarcely probable that its form was due to a knowledge of the southern pyramids, as is evinced in the case of the Cahokia pyramids.

Hopewell is a very highly developed local culture, very much specialized and confined to an area approximately 150 by 125 miles in extent. Notwithstanding the fact that ceramic art was more highly developed in the south, it is safe to assume that in copper, quartz crystal, bone and pipe effigies the Hopewell people were not surpassed and seldom equalled by any other tribe of Indians, either ancient or modern, within the area embraced by the United States.

It is my belief that Hopewell itself was the metropolis of this ancient people, where resided the chief traders or merchants, as well as the most skilled artisans.



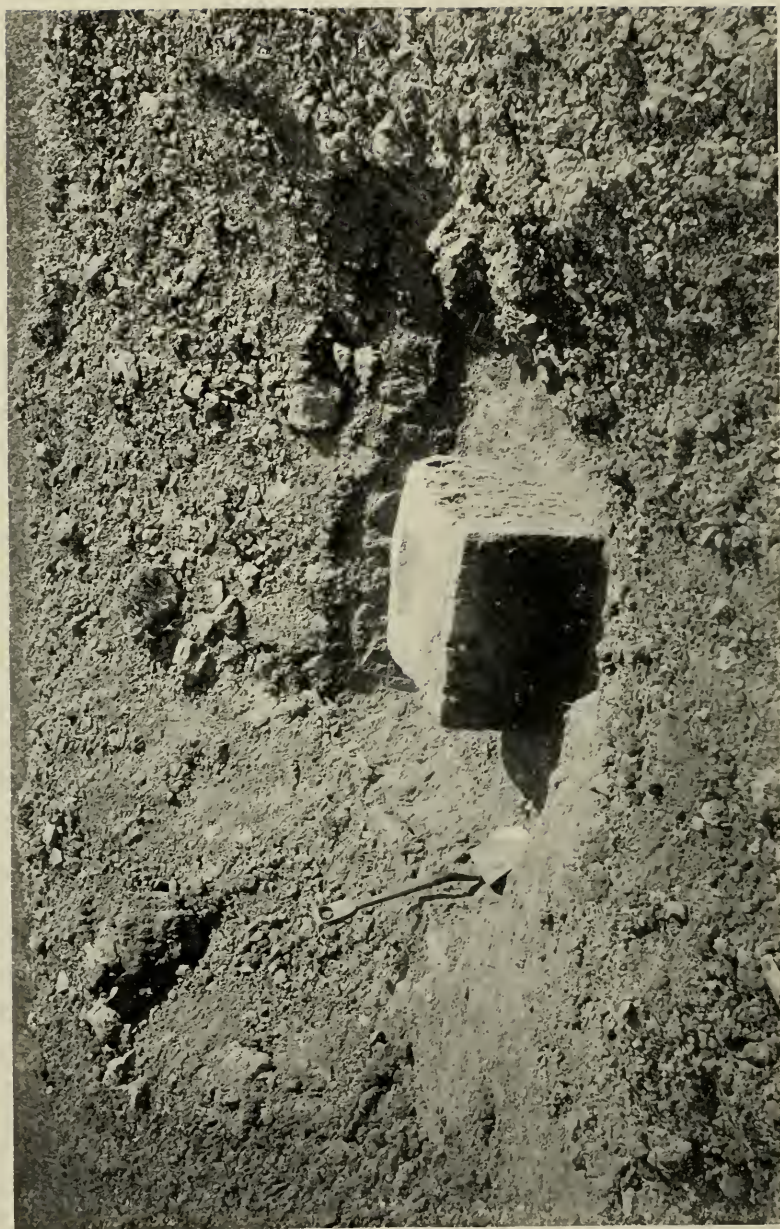
VIEW OF THE TERRACE OCCUPIED BY THE HOPEWELL GROUP; CAMP OF THE SURVEY IN THE FOREGROUND (p. 88).



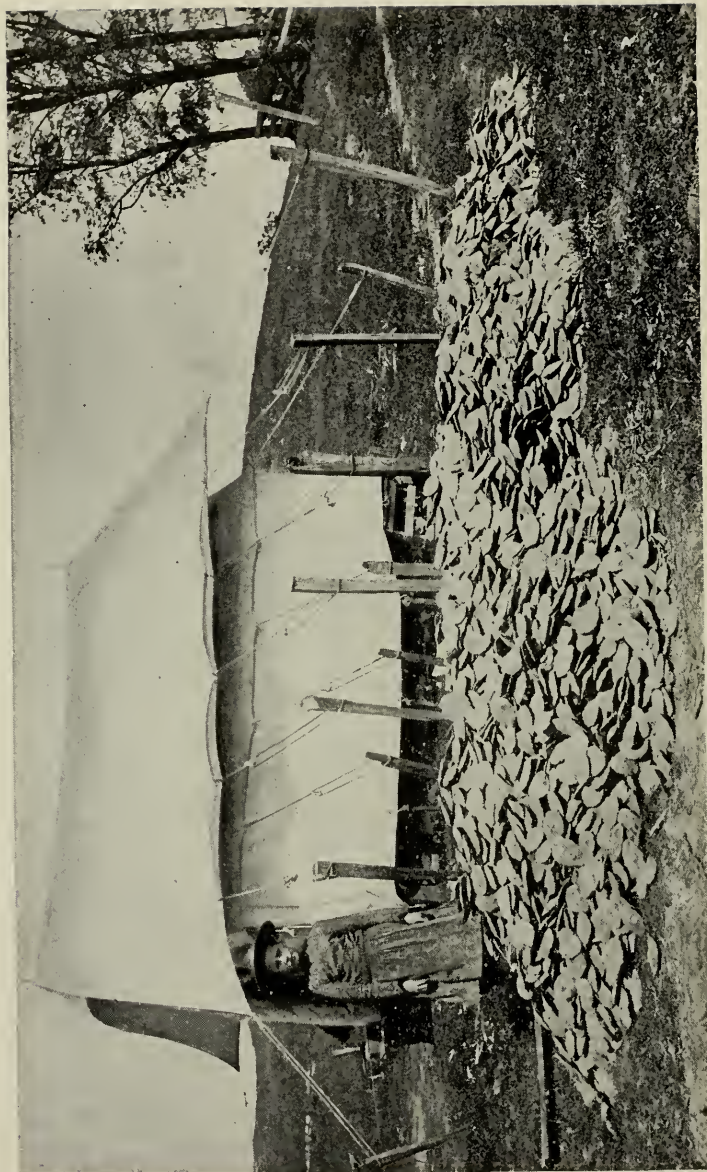
LAYER OF MICA IN MOUND 17 (p. 91).



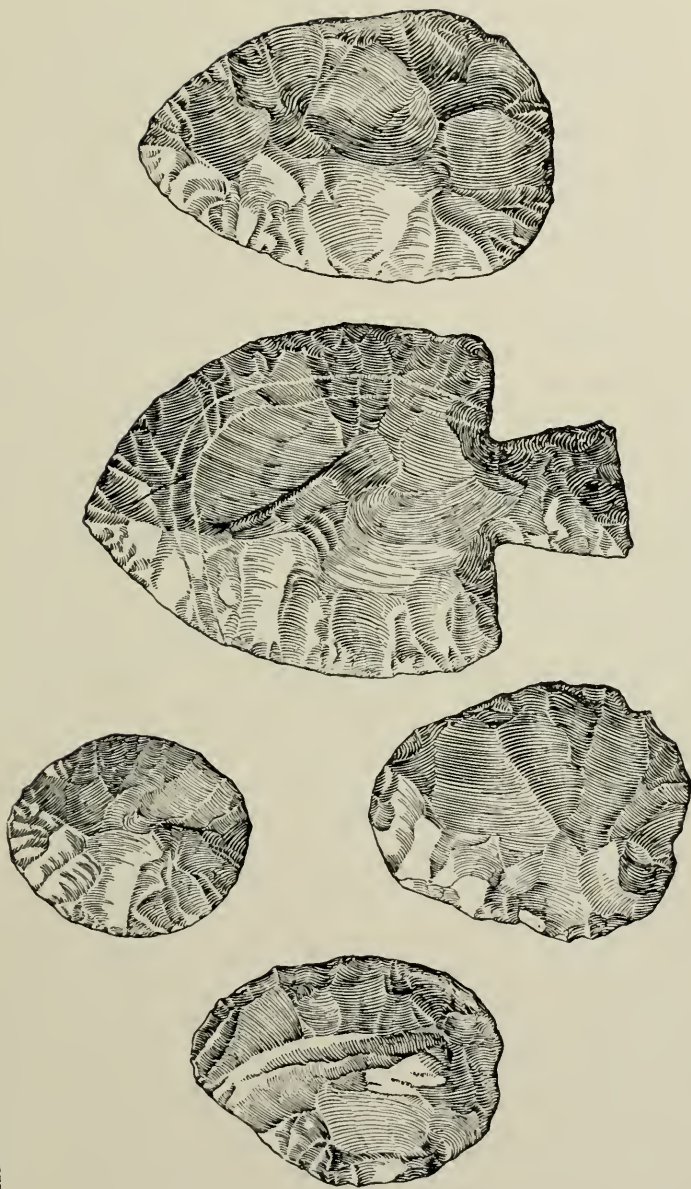
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ALTAR IN MOUND 19 (p. 94).



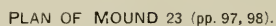
PILE OF DISKS FROM MOUND 2 (p. 95).



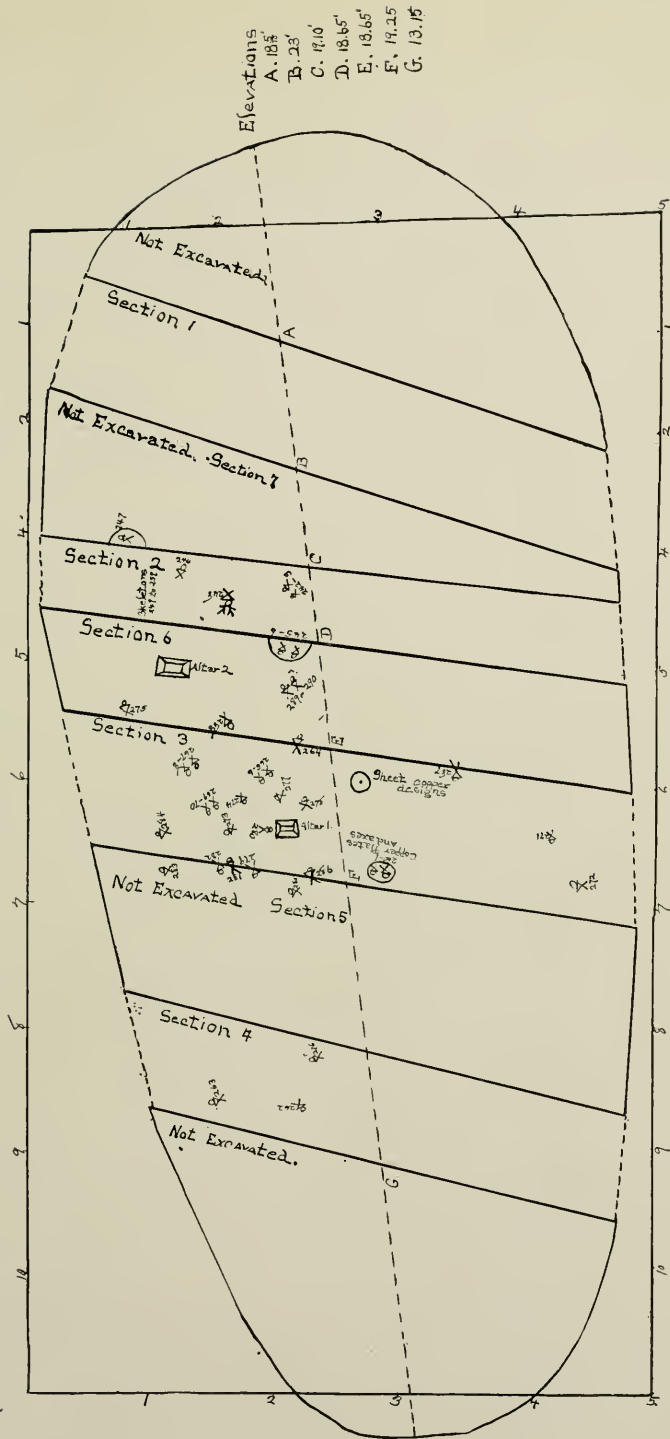
FLINT DISKS FROM MOUND 2 (p. 95).



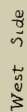
MOUND 23 (p. 97).



PLAN OF MOUND 23 (pp. 97, 98).



PLAN OF THE SECTIONS IN MOUND 25 (p. 103).



PLAN OF SECTION 2 IN MOUND 25 (p. 106).



SKELETON 248 AS IT WAS FOUND IN THE MOUND (p. 107).



PERFORATED TEETH, BEADS, AND BROKEN COPPER PLATES LYING ON THE CHEST OF SKELETON 248 (p. 107).



1



2



3



4



6



7



5



8

1-3, ADZE BLADES; 4-8, COPPER AXES (p. 117).



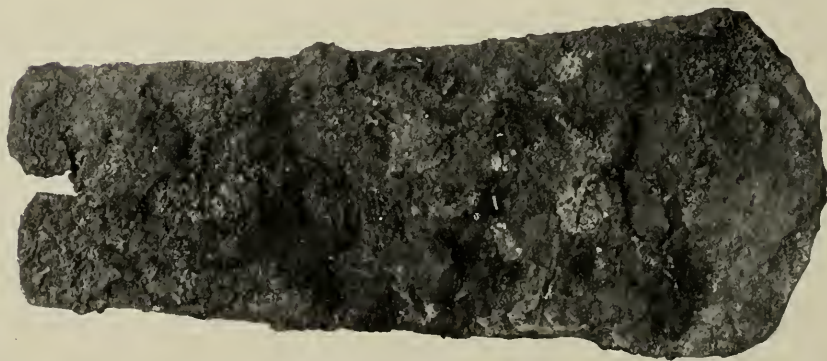
AXE FROM DEPOSIT OVER SKELETONS 260 AND 261 (p. 117).

FIELD MUSEUM OF NATURAL HISTORY.

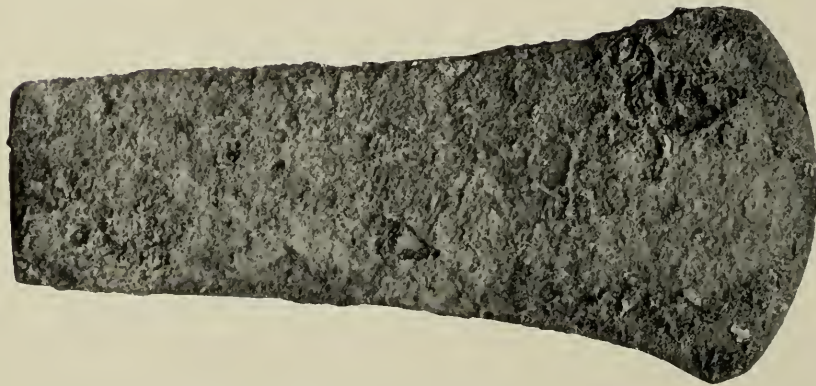
ANTHROPOLOGY, VOL. VI, PL. LIII.



LARGE COPPER CELT-SHAPED OBJECT FROM SKELETONS 260 AND 261 (p. 118).



1



2

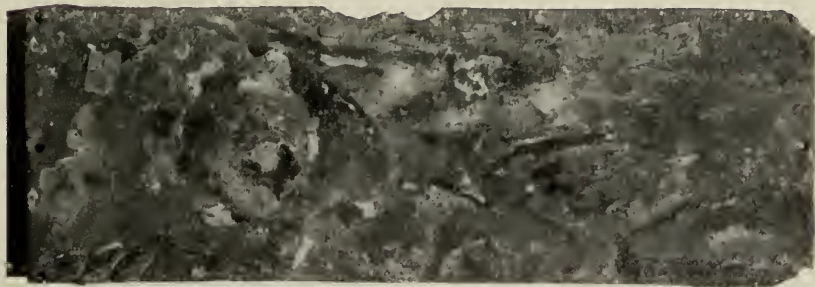


3

1, DISINTEGRATED CELT; 2, TYPICAL COPPER HATCHET FROM MOUND 25; 3, COPPER HATCHET SHOWING CORRUGATED SURFACE (p. 118).



1

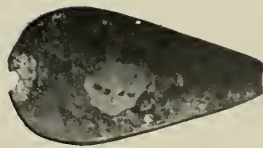


2

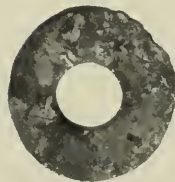
COPPER PLATES (p. 119).



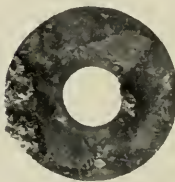
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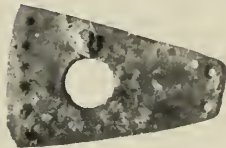
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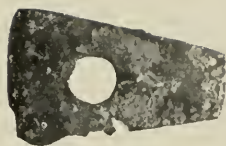
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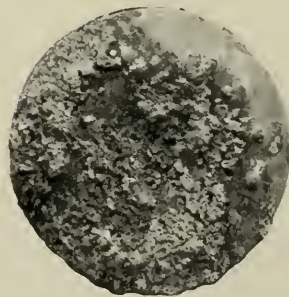
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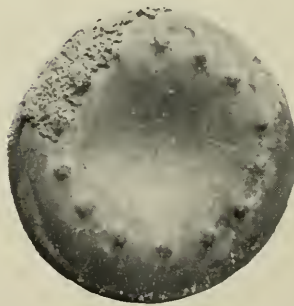
5



6



7



8

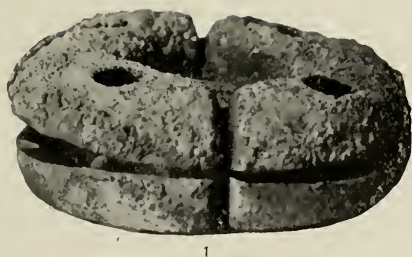


9



10

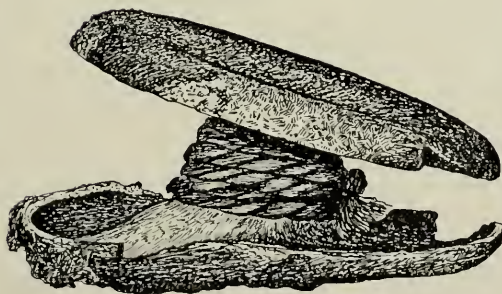
1-6, COPPER DISKS AND SPOON-SHAPED OBJECTS FROM MOUND 25; 7-10 FOUR DIFFERENT EAR-ORNAMENTS FROM MOUND 25 (p. 121).



1



2



3

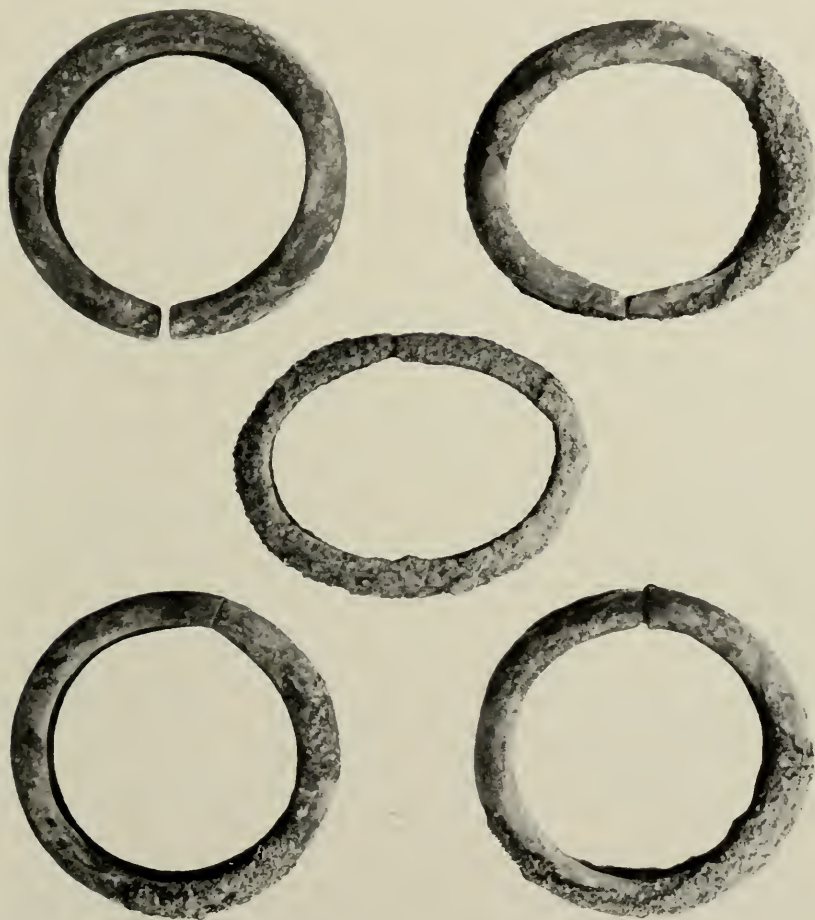
SPECIALIZED EAR-ORNAMENTS: 1-2, SHOWING REPOUSSÉ WORK; 3, WITH STRINGS AROUND THE CENTRE (p. 122).

FIELD MUSEUM OF NATURAL HISTORY.

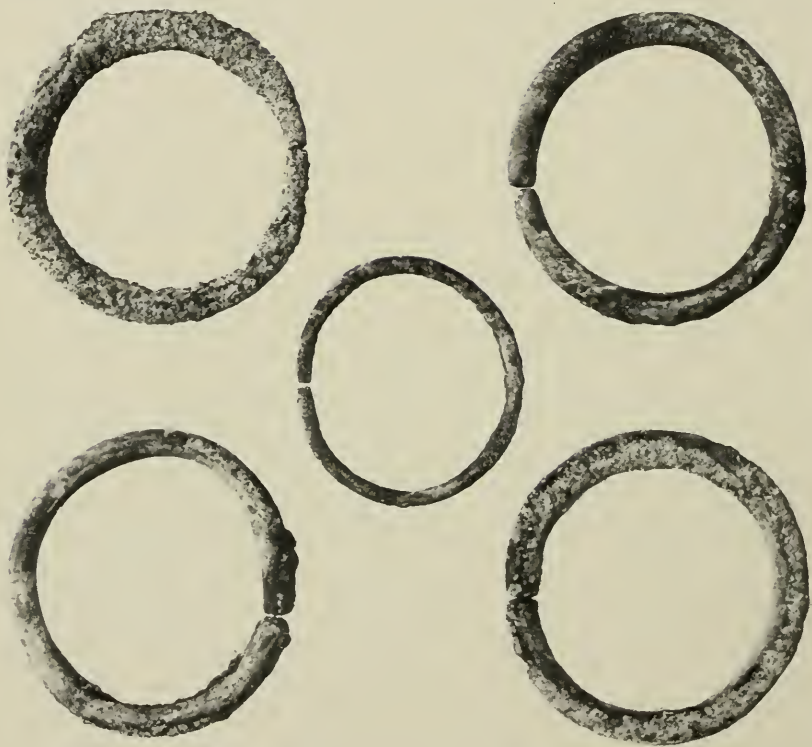
ANTHROPOLOGY, VOL. VI, PL. LVIII.



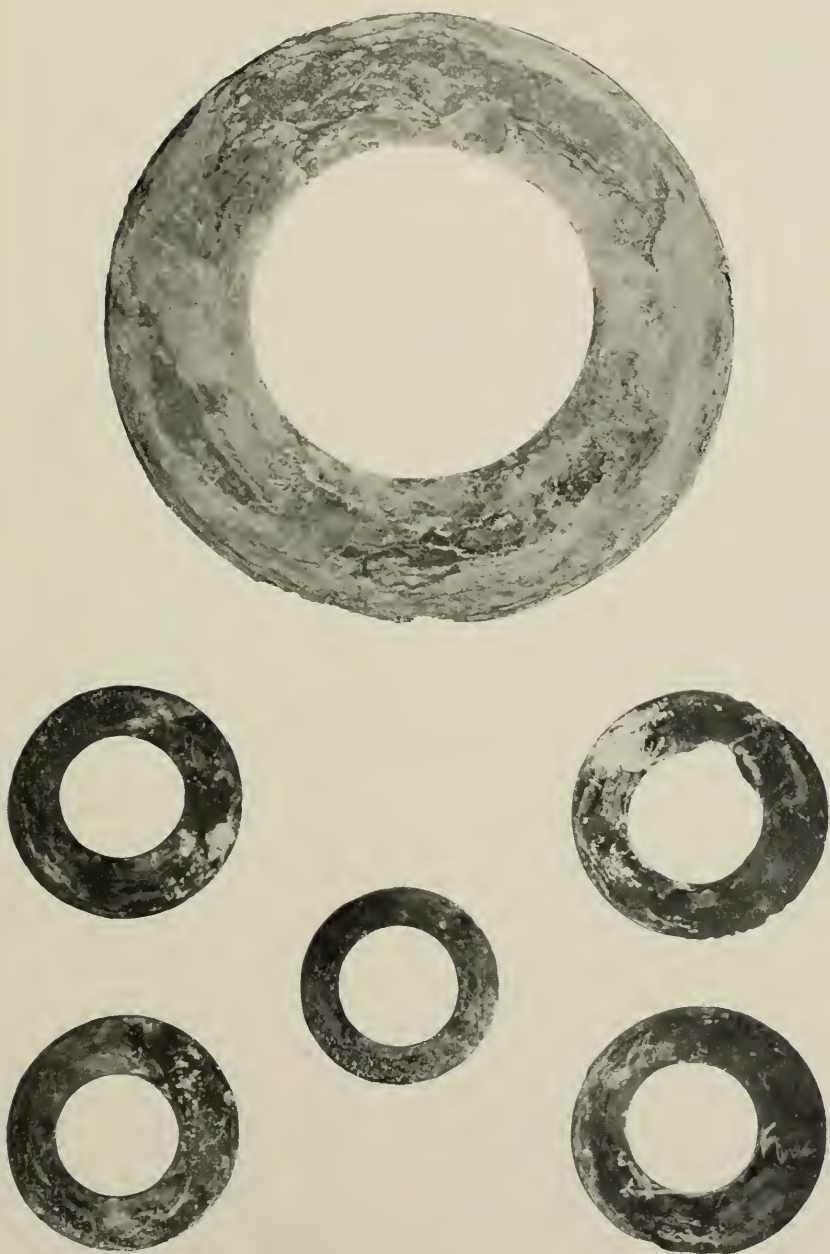
BRACELETS (p. 122).



ANKLETS OR BRACELETS (p. 123).



ANKLETS OR BRACELETS (p. 123).



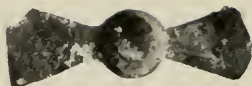
COPPER DISKS (p. 123).



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9

1-4, WINGED BUTTONS OF COPPER; 5-9, UNKNOWN FORMS IN COPPER (p. 124).

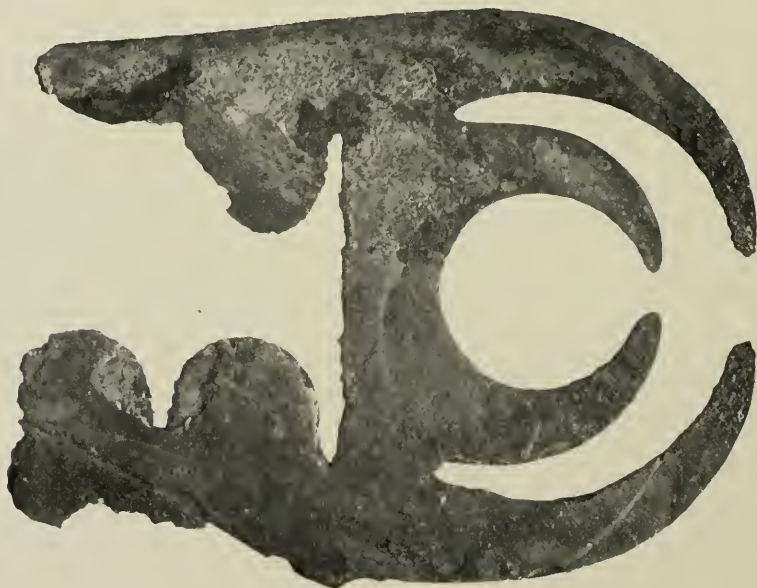
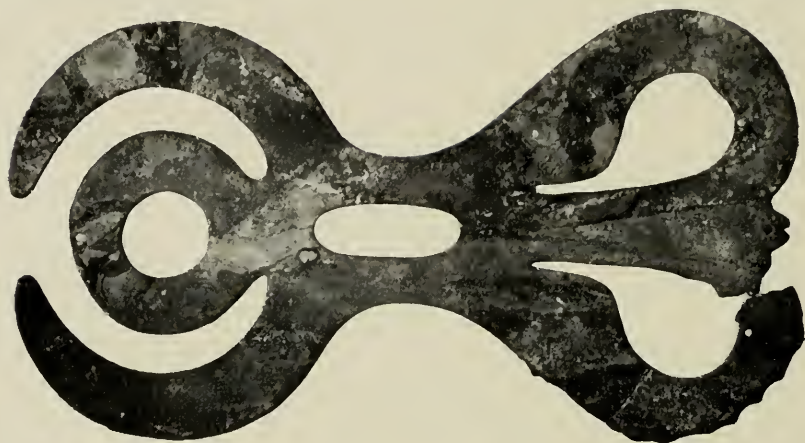


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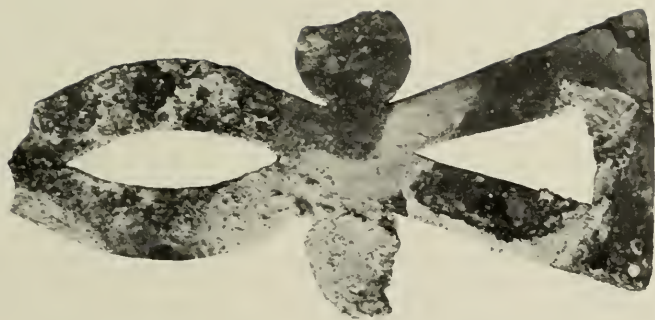


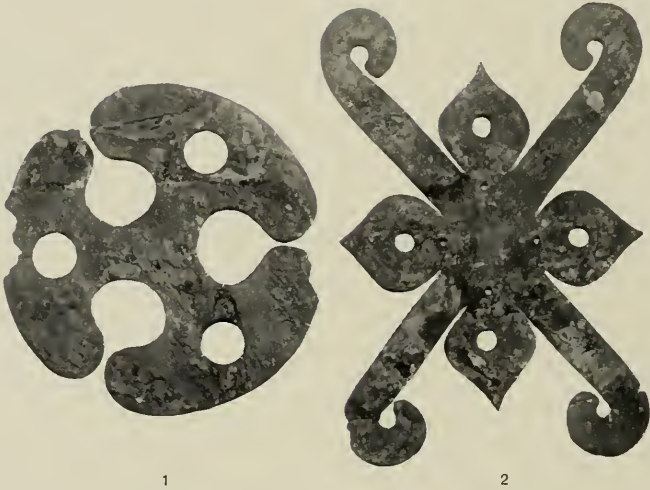
2

1, UNKNOWN DESIGN IN COPPER; 2, PROBABLY SERPENT HEAD IN COPPER (p. 124).

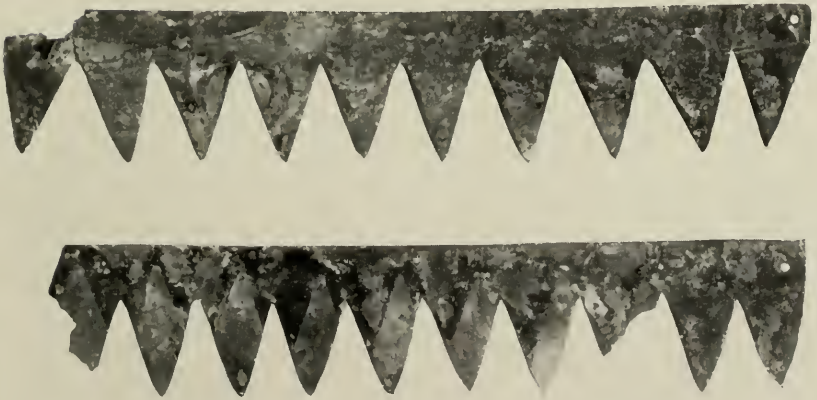


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1-2, COSMIC SYMBOLS IN THIN COPPER; 3, DESIGN OF SHEET COPPER (p. 124).



OBJECTS OF SHEET COPPER, DESIGNS UNKNOWN (p. 124).



1



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4

1-2, SWASTIKAS IN COPPER; 3-4, COPPER OBJECTS IN OPEN WORK (pp. 124, 125).



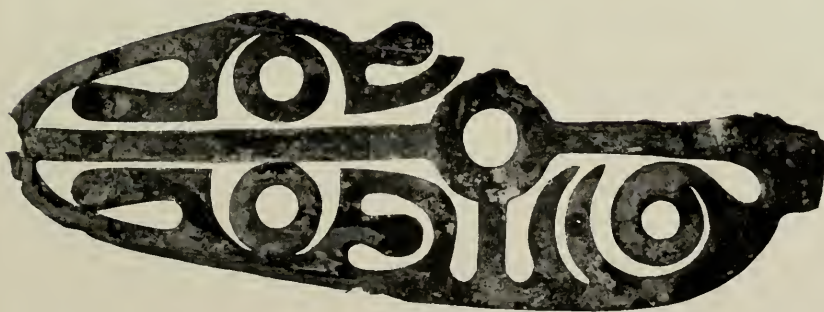
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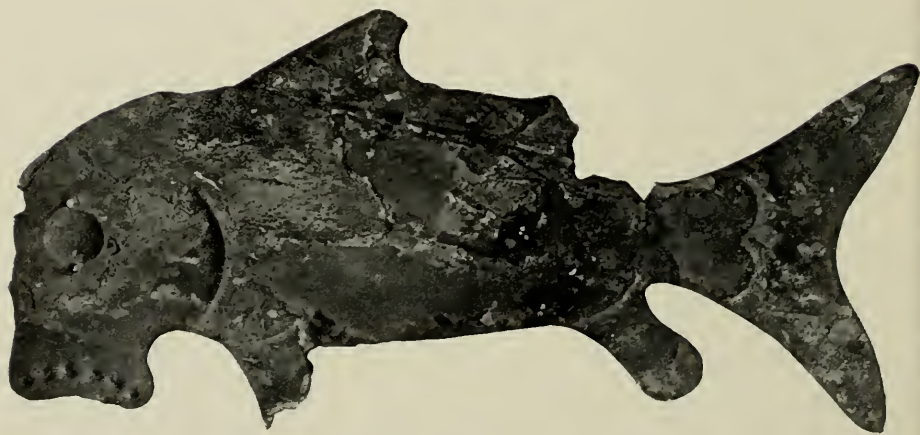


4

1-3, COPPER OBJECTS IN OPEN WORK; 4, SHEET COPPER, PROBABLY
REPRESENTING HEAD OF SERPENT (pp. 124, 125).



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3

1, BEAR'S FOOT; 2, FISH EFFIGY; 3, EAGLE EFFIGY, ALL IN SHEET COPPER (pp. 125, 127).



1



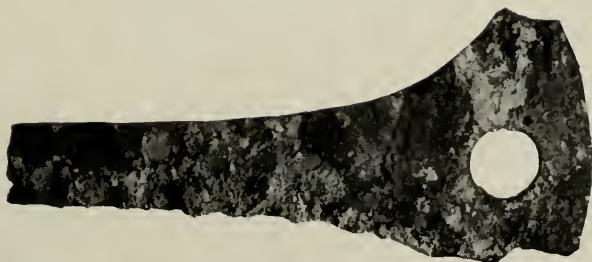
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1-2, CONCAVE COPPER OBJECTS; 3-5, BEAR'S TEETH IN COPPER, BROKEN PROBLEMATICAL FORM AND COPPER ORNAMENT (pp. 125, 126).

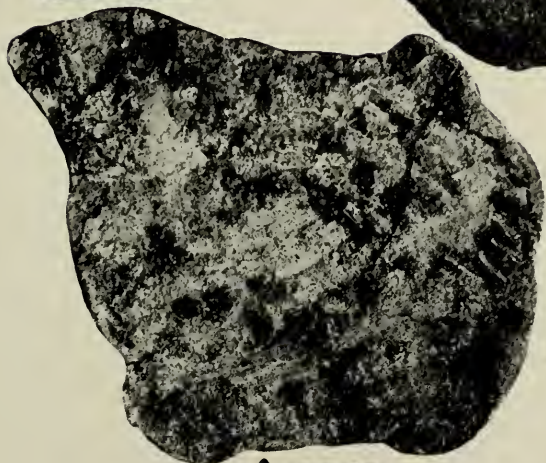


TOP VIEW OF HEAD-DRESS (pp. 126, 162).

1-2



3



4-7



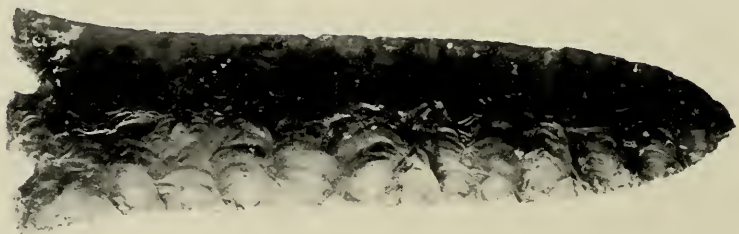
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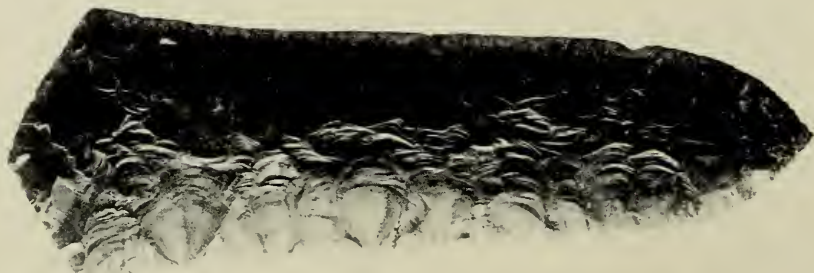
COPPER PIECES MELTED BY THE HEAT OF THE ALTARS (p. 128).



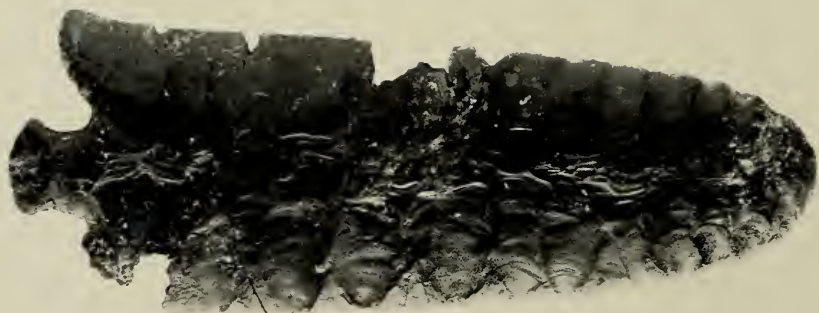
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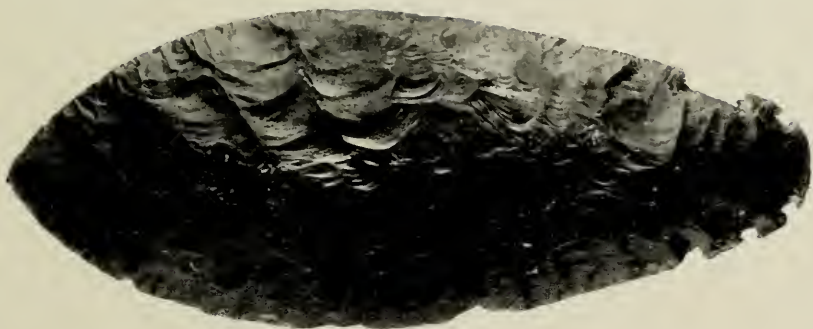


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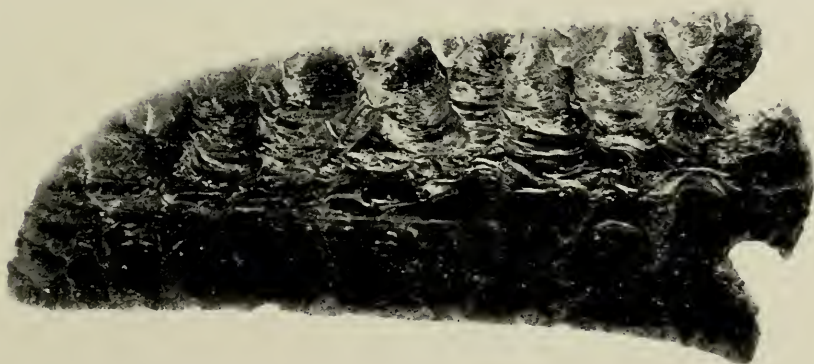


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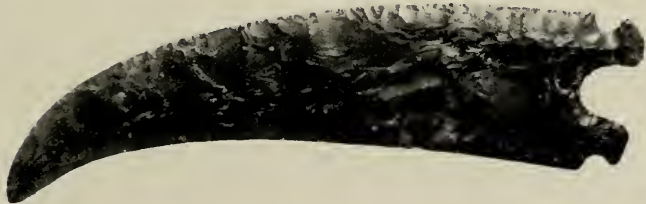
1-2, LARGE OBSIDIAN BLADES FROM ALTAR 2; 3, OBSIDIAN BLADE RESTORED (p. 132).



1



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3

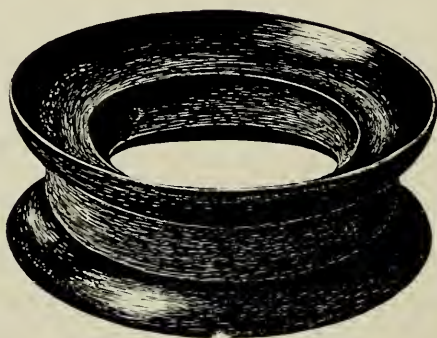
1, SPECIALIZED OBSIDIAN BLADE; 2-3, PROBABLY KNIVES (p. 132).



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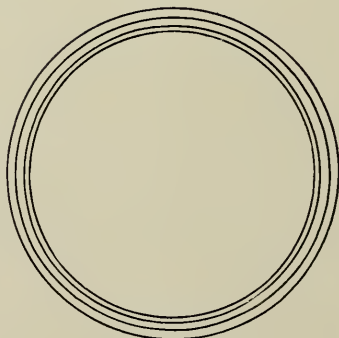
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1-4, STONE RINGS FROM ALTAR 1; 5, OUTLINES OF RINGS (p. 139)

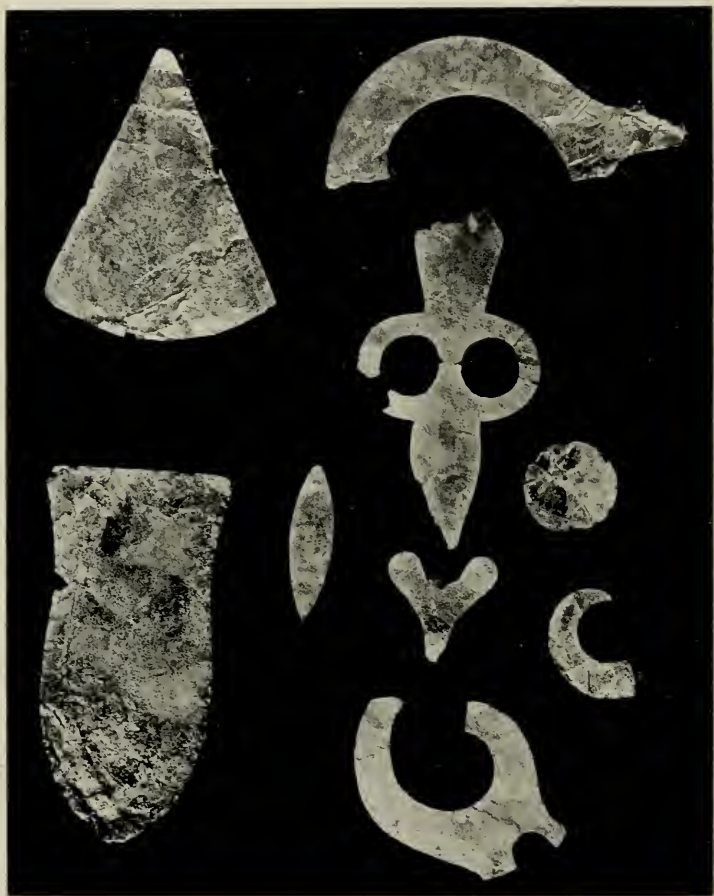


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2

1, ENGRAVED PIPE FROM ALTAR 2; 2, DUCK-FISH PIPE FROM ALTAR 2 (p. 140).



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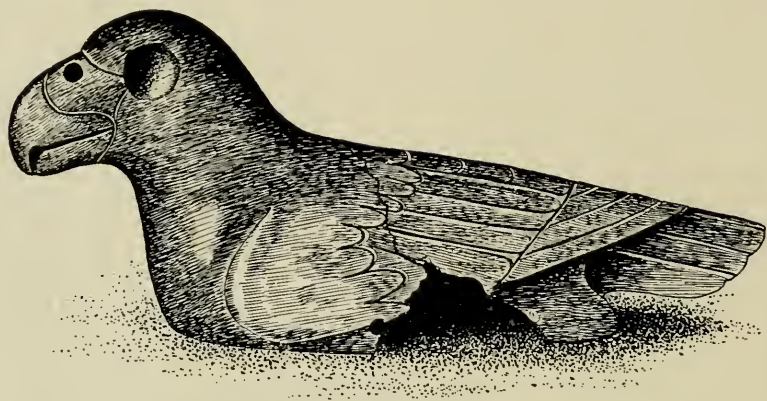


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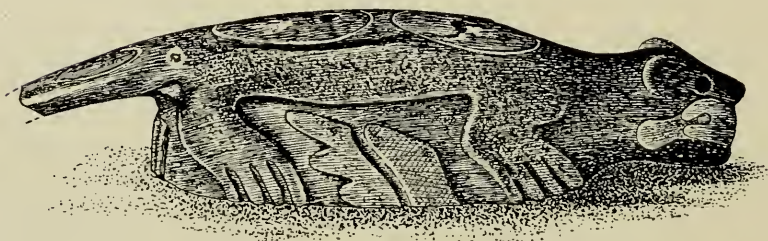


2

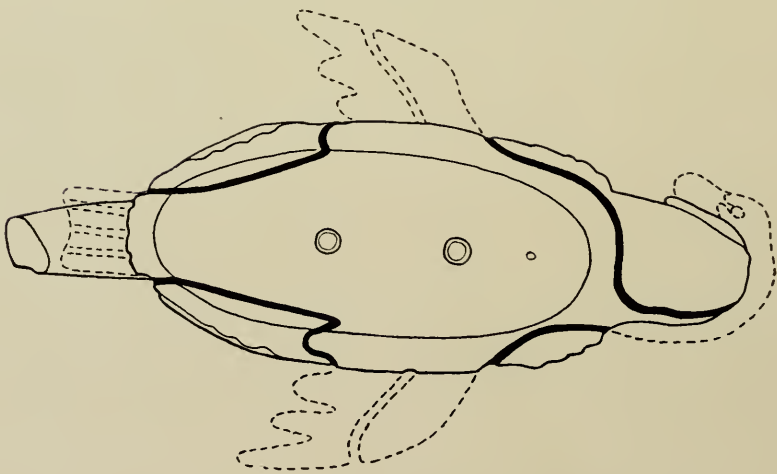
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1



2



3

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